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RURAL AGRARIAN HOUSEHOLD DIVERSITY IN THE LATE CLASSIC (600-950 A.D.) NACO VALLEY, NORTHWEST HONDURAS

by

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RURAL AGRARIAN HOUSEHOLD DIVERSITY IN THE LATE CLASSIC (600-950 A.D.) NACO VALLEY, NORTHWEST HONDURAS

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The rural sector of agrarian societies has often been viewed as composed of simple agrarian households primarily interested in self-sufficiency in staple production, undifferentiated from one another. In more recent times, households have been seen as much more diverse than previously thought, but are still poorly understood. This dissertation investigates four models of household wealth and production in the Late Classic (600-950 A.D.) Naco Valley, Northwest Honduras to better understand this variability.

Analysis of household size/composition, wealth, and range and relative intensity of craft production indicates that rural households in the Late Classic Naco Valley were highly differentiated from one another. The basis of these distinctions, overall, does not appear to correlate well with the degree of soil fertility directly accessible to households. Analysis presented here evaluates the relative importance and basis of rural household diversity as they relate to the basis of social complexity, rural/urban interactions and access to other natural resources.

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CHAPTER ONE

"[In a peasant agrarian economy] the household was perhaps the most flexible and responsive social grouping...The family household is an institution sensitive to minor, short-term fluctuations in the socioeconomic environment and a prime means by which individuals adapt to the subtle shifts in opportunities and constraints that confront them." (Netting 1979, cited in Netting, Wilk and Arnould 1984:xiii).

Introduction

Household studies in archaeology have engendered increased interest during the past twenty years. Until the middle of this century, particularly in Mesoamerican archaeology, little time was invested in researching the smallest, yet most abundant, remains of ancient societies: low mounds representing the physical dwellings of families and households (see Ashmore 1981). In fact, during initial survey and mapping at some lowland Maya centers early in this century (Ricketson and Ricketson 1937), household mounds of varying sizes were missed entirely, perhaps due to the desire of researchers to investigate only structures presumably occupied by elites. However, in more recent years, increased emphasis has been placed on commoner households and their variability (Arnold 1991; Ashmore 1981; Ashmore and Wilk 1988; Blanton 1994; Bermann 1994; D'Altroy 1994; Gonlin 1993; Hirth 1993; McAnany 1993; Smith 1987; Wilk 1983).

Attention has shifted to household strategies and composition, but both phenomena remain poorly understood. Rural sectors of agrarian societies have often been viewed as

composed primarily of conservative households interested in self-sufficiency in staple production. As well, rural households have been traditionally viewed as composed of homogeneous peasantries isolated from larger political and economic trends (Gonlin 1994; Sahlins 1972; Smith 1994). Moreover, in archaeology there has been a tendency, especially in Mesoamerican archaeology, to view social complexity in terms of urbanism. This has helped further the presumption that rural areas were/are occupied by simple agriculturalists, undifferentiated from one another (Smith 1994).

However, recent research in Mesoamerica and elsewhere (e.g. Gonlin 1993; Schwartz and Falconer 1994) has cast doubt on these notions, with a new picture emerging of great variability in rural household composition, wealth and economic activities. As such, ancient rural societies appear to be much more differentiated than originally thought, although the basis of this household diversity is still much debated.

Conceptualizing the Household

As is usually pointed out, the household is a fundamental unit of society (Netting, Wilk and Arnould 1984; Wilk and Ashmore 1988). However, how do we define the "household"? After all, from culture to culture, there are great differences in the factors that shape household structure. Following Wilk and Rathje (1982:618), I conceptualize the household as

> "the most common social component of subsistence, the smallest and most abundant activity group. This household is composed of three elements: (1) social: the demographic unit, including number and relationships of the members; (2) material: the dwelling, activity areas and possessions; and (3) behavioral: the activities it performs. This total household is the product of a domestic strategy to meet the productive, distributive and reproductive needs of its members."

That is, the household is defined by a dwelling, the activities the members undertake, and the members themselves. While all three elements of a household are important, obviously in archaeology the physical dwelling is the most visible indicator of what is a household. Archaeology, by nature, is materialist, examining the physical remains of past cultures. To avoid conceptualizing households strictly as objects or things, households need to be viewed as spheres of activities; that is, what households do (Wilk and Netting 1984; Ashmore and Wilk 1988). A household, therefore, can be viewed as "essentially an activity group" (Ashmore and Wilk 1988:3). Households are also, at times, confused by archaeologists with families. A family is a social membership defined by actual or fictive kinship. A household, on the other hand, is based on behavior (Lightfoot 1994:12). By viewing the household in terms of function and behavior, one is able to make cross-cultural comparisons.

To understand what households do, it is important to determine possible functions households may undertake. Netting, Wilk and Arnould (1984) and Wilk and Rathje (1982) offer five primary functions of households. First, households

produce. Defined as activity, "that procures or increases the value of resources" (Netting, Wilk and Arnould 1984:6), production is an important activity that affects greatly the composition and organization of the household. Second, households distribute. That is, they allocate, pool and share resources available to them. Third, households transmit. This function can encompass a goodly number of activities, but the primary function of transmission involves the passing on of scarce goods between generations of household members (i.e. inheritance). Certainly, there are many similarities between distribution and transmission, but the role of inheritance suggests temporal differentiation. That is, while households will distribute generalized goods to members habitually, the transmission of specific, distinctive goods may be a more specialized activity, only undertaken during restricted periods. Fourth, households reproduce. For households to continue through time, reproduction is essential. Household reproduction encompasses such activities as care and education of offspring, so as to maintain the labor pool through time. The developmental cycle (Fortes 1958; Goody 1972; Haviland 1988; Tourtellot 1988) is related to household reproduction. Finally, households co-reside. Like the other four previous functions, co-residence will have an affect on household composition and the activities its members will undertake.

As the dissertation progresses, I will refer back to these five functions of the household. In archaeological studies undertaken in the Maya area, a general assumption,

based on ethnographic analogies drawn from contemporary Maya households, is that there was co-residence. Physically, this is seen in the patterned remains of house mounds around at least one patio or plaza (see Ashmore 1981). These corporate living groups, possibly containing several families, are referred to as patio groups. Spatial proximity, either among structures in a single patio group or between two or more patio groups, may reflect social cooperation and shared identity (e.g. Wilk 1984, 1991).

Agricultural Potential and Household Production

In agrarian societies, households are responsible for their own sustenance, either through the production of food themselves, or by producing goods that are exchangeable for food. Beyond the needs of the household, people in most complex societies must produce goods to pay taxes or tribute demanded by elites for either the elite's personal needs or for the funding of public work projects (see Carniero 1981; Earle 1987; Fried 1967; Sahlins 1972; but see Feinman and Neitzal 1984 for a contrasting view). In this way, agrarian households in hierarchical societies are likely to be compelled to produce more than is necessary for their own needs.

Households on good agricultural land may have little problem delivering tribute because of the potential for surplus production resulting from productive land. This surplus would also enable households to trade for exotic goods

and a range of prosaic items, objects that could be used to define wealth archaeologically (see Smith 1987). However, households on less productive agricultural land may have difficulty satisfying elite tribute demands, as well as their own caloric needs. As a result, households on less productive soils may undertake a variety of other activities to supplement their agricultural production, including craft manufacture (D. Arnold 1975, 1985; Feinman, Blanton and Kowalewski 1984; Graves 1991; McAnany 1993; Papousek 1981; Rice 1981, 1984)

Craft production in complex societies, while it may take a variety of forms, can be defined as the part- or full-time craft production of nonagricultural items for exchange with others for similar or dissimilar items by, at a minimum, some members of the household. Following Costin (1991:3), I define specialization as, "the regular, repeated provision of some commodity or service in exchange for some other." Specialization occurs when household members produce nonfood items for non-household individuals. Household craft production, goods produced for local consumption (P. Arnold 1991; Hayden 1994), differs from household industry, good produced for consumption outside the immediate household (P. Arnold 1991) in the context, concentration, scale and intensity of specialization (see Costin 1991). Craft production, as defined above, relates more directly to household industry. This qualification relates back to Sahlins' (1972) distinction between generalized and

specialized domestic production. In this way, the level, range and organization of craft production may differ among households due to a variety of factors (Rice 1981; Sahlins 1972). A full discussion of the mode and tempo of craft specialization, including its archaeological correlates, will be presented in Chapter Three.

Ecology of Production Model

One model that suggests differences in the range, organization and intensity of household craft production is the ecology of craft production model (e.g. D. Arnold 1975, 1985), a modified version of Arnold's ceramic ecology model. This model focuses directly on the interactions between craft production and the natural and social environment, postulating that households located on poorer soils cope differently with demands placed on them than those on better soils (see P. Arnold 1991:4). In this case, households on poorer soils may not be able to produce sufficient subsistence goods to meet the demands placed on them by ruling elites. As a result, these households are forced to intensify craft production of non-agricultural goods, such as craft items, in order to trade for food supplements or as a substitute for tribute. For example, Smith (1994) documents cases of Aztec households with decreasing living standards associated with high degrees of specialized cotton textile manufacturing, manifest by unusually high densities of spindle whorls. While his analysis is not based on soil quality, the relationship between poor

living standards and intensified production is certainly related. Graves (1991) has shown that poor households in northern Luzon, the Philippines, unable to meet their total caloric needs through their own agricultural labors, produce ceramic vessels as a way of supplementing their diet through exchange. A similar situation occurs in Dalupa, the Philippines, according to Stark (1995). Kalinga households who undertake ceramic craft production are poorer than other households; in fact, part-time potter households have the lowest wealth indicators in the community. Finally, Cook (1982) has shown that metateros (producers of grinding stones) in Oaxaca, Mexico engage in this craft to supplement meager agricultural harvests on infertile land. Poor households may, therefore, initiate or increase craft production to augment their agricultural income.

Good Resource Production Model

If one might expect that households on infertile soils may be involved in household craft production or industry, what about households located on good, productive soils? Households located on better agricultural soils may be able to reap the benefits of excess agricultural production; that is, they can harvest more than they are able to use or store. As a result, these households may exchange some of the excess staples for items of wealth, such as imported ceramic vessels. In essence, then, this model suggests that households on better soils may produce more, and thus gain more wealth, than

households on poorer soils. In this model, wealth, craft production and soil productivity are strongly related.

In sum, one may expect to find differences in the range, organization and intensity of domestic production dependent on where households are located in the physical landscape, particularly with reference to soil productivity. If households are able to meet their own caloric needs, as well as tribute demands, through agricultural practices, then one might expect a limited amount of craft production. If, however, households are unable to meet all internal and external demands placed upon them from agriculture alone, then one might expect increased craft production (see P. Arnold 1991; Hayden 1994; Smith 1987, 1994).

However, the correlation between soil productivity and craft production is not a simple one. Households on better soils may be able to engage in types of domestic craft production that households on poorer soils are unable to undertake. Correspondingly, households on poorer soils may be forced to engage in manufacturing activities not seen on better soils. Instead of simply arguing that households on poorer soils would have to intensify craft production, alternative craft production activities on different soils may function as distinct, adaptive strategies.

Household Wealth, Composition and Agricultural Potential

There is a general correlation between rural household composition, wealth accumulation and local agricultural

potential revealed in both archaeological and ethnographic studies (e.g. McAnany 1993; Netting 1982, 1993; Wilk and Rathje 1982). Access to productive agricultural resources, it has been hypothesized, is restricted in complex societies (Fried 1967), giving a competitive advantage to those who posses those resources. Agrarian households on more productive lands may be larger, either in total structures or in mean structure size, and wealthier, due to their privileged access to resources (Netting 1982, 1993; Wilk and Rathje 1982). Wealthy households also tend to have larger houses (Hayden and Cannon 1982; Netting 1982; Wilk 1983, 1991). This may be due to the desire of offspring to inherit land (see Wilk and Rathje 1982), or to the tendency of wealthy households to add "client households" whose members aid with agricultural labor without jeopardizing land rights (Hendon 1989, 1991; Wilk and Rathje 1982; McAnany 1993). On poorer soils, household size may be smaller and exhibit fewer signs of wealth due to a lack of agricultural potential with which to sustain a large family, as well as to create an agricultural surplus (Netting 1982). Households may also be smaller due to family members becoming "client households" on the more productive land of better situated households (Wilk and Rathje 1982).

This discussion of household wealth and composition suggests that if wealth and household composition are strongly related to soil productivity, then there may also be differences in household developmental cycles (e.g. Goody 1972, Haviland 1988; Tourtellot 1988). Households on better

soils may, through time, become larger, extended corporate units, incorporating extra- and extended family members (e.g. Pasternak et al. 1976). Alternatively, households on poorer soils may stay smaller co-residential or single family units throughout the household's life, in effect fissioning more often than households on better soils. Archaeologically, this may be seen through a difference in the number of structures constituting the household, as well as the presence or absence of multiple cooking areas and craft production loci (Hendon 1991).

Founder Household Wealth Model

Recently, McAnany (1992, 1993, 1995) has argued that in complex societies, in this case the ancient lowland Maya, the roots of inequality relate to elite monopolization of prime agricultural land. In this model, referred to as the "Founder Household Wealth model," there may be a correlation between household wealth, composition and soil fertility. Essentially, there are three ways to possess land rights, according to McAnany. Households may inherit land from ancestors, may push out others who already possess land, or may occupy land for the first time as pioneers. She argues that as regions fill up with settlement, those households located on prime agricultural land from early on in the occupation of the area will have a basis for wealth not replicable by others. In effect, these households will have a monopoly on the most productive agricultural land. As population increases in the

region, wealthy households may adopt recently immigrated, possibly landless, families, thus increasing the productive potential of the coresidential unit and creating a heterogeneous household with varying degrees of wealth among its members.

This principle of first occupancy (see Isaac 1996; McAnany 1995:96-97) leads to increasing and notable disparities of resource allocation through time. Those first occupants of prime agricultural land, according to McAnany, will legitimize their claim to land through ancestor veneration. The creation of ancestral shrines or other ways to maintain the presence of ancestors creates, in McAnany's (1995:99) words, "a genealogy of place." Descendent household members, in this way, create and/or maintain inheritable claims to land first held by founding household members thousands of years before. While on the surface the principle of first occupancy may sound equitable, through time this situation may create the basis for unequal access to fertile agricultural land.

Wealth Centralization Model

This correlation between soil productivity, wealth and settlement has been postulated for different areas of the globe across time and space. However, this may not always be the case. For example, in the prehispanic Valley of Oaxaca, Mexico, at the regional level there is not a clear pattern of prime agricultural land being occupied prior to more marginal

land (Feinman and Nicholas 1990). Other factors, such as establishing settlements near existing administrative centers, were seen to be more important. Certainly, settlements do not equate households; however, settlement location not being based primarily on agricultural fertility is related to this discussion. Political factors, therefore, motivated household strategies, not simply economics. Regional settlement pattern research in the Valle de la Plata, Colombia, suggests that social hierarchy was not based on elite control of agricultural land (Drennan and Quattrin 1995).

It has long been argued in Mesoamerica that households located near civic-ceremonial centers will be wealthier and have a higher status than households located on the periphery, further removed from these administrative foci (e.g. Gonlin 1993:662). A strong linear relationship between wealth and distance is apparent at some lowland Maya centers, such as Coba, in northern Yucatán (see Folan et al. 1979, cited in Arnold and Ford 1980). At other centers, such as Tikal, in the Guatemalan Peten, this relationship has been questioned (Arnold and Ford 1980). Direct-line distance may affect the ability of households to obtain prestige goods from core elites who would control access to such items. In this model, household wealth would be related less to the productivity of its surroundings and more to the household's proximity to elites and centralized power at the regional capital.

As a result, wealthy households may cross-cut soil fertility, rather than be located only on productive

agricultural land. Household distance from a regional capital may have a direct affect on the degree of household wealth. Households farther from a regional capital may have more difficulty obtaining restricted goods which are controlled by elites than households closer to the regional capital. Therefore, distance to the capital and centralization of power by elites at the capital are key components of this model, referred to as the "Wealth Centralization Model."

Research Questions

As outlined above, household research has shown that there is potential for a great deal of agrarian household variability in wealth, composition and craft production. To evaluate the four proposed models, this dissertation will dwell on the following questions:

1. Do households on different soils exhibit similar craft production patterns? If not, how do households differ in the range, organization and intensity of craft production?

This question specifically addresses the Good Resource Production and Ecology of Production models. The Ecology of Production model focuses on craft production strategies of households on poor agricultural land. If this model is correct for the Naco Valley, one ought to see households on poor soils intensifying, and possibly diversifying, craft production, focusing on a very limited number of craft manufacture activities. If households on infertile soils engaged in a

number of diverse activities, this model may not be applicable for the region. On the other hand, the Good Resource Production Model looks at craft production activities of households located on fertile agricultural land. For this model to be applicable in the Naco Valley, one would expect that households on productive soils would undertake more diverse craft production activities, and with more intensity, than households on less fertile soils. If households on both good and poor soil exhibit similar craft production patterns, this model is not applicable. In both models, the focus is on the degree, intensity and diversity of craft production.

2. Does household wealth or composition vary among households depending on the quality of soils? Specifically, do wealth differences cross-cut soil types, or is there a close association between wealth and soil fertility?

This research objective tests models related to household wealth, composition and agricultural potential. Specifically, ethnographic literature and archaeological analogy suggest that households on good agricultural land tend to be wealthier and larger than households on poorer agricultural land. If this is not the case in the research area, then wealth and household size may not have been affected by soil fertility. Wealth may, therefore, not be a function of agricultural production, even in rural settings.

3. Does household wealth correspond with the intensity or degree of production?

This research question again addresses the Ecology of Production and Good Resource Production models. An underlying premise of both constructs is that intensity and degree of craft production may be related to the relative wealth of a household. The Ecology of Production model supposes that households on infertile soils have to engage in crafts, particularly ceramic, production to satisfy tribute and caloric needs. Ethnographic analogy related to Ecology of Production suggests that, in these cases, the families are materially impoverished. The Good Resource Production model suggests that households on good soils tend to produce intensively a large variety of goods and, as a result, are able to trade surplus goods for wealth items.

4. Does household wealth vary with distance from the regional capital?

This research question specifically relates to the Wealth Centralization Model. While many of the models this dissertation addresses invoke specific household craft production (i.e. economic) patterns, the focus here is rather on political centralization by elites. This model suggests that access to items of wealth has a clear correlation with linear distance to the regional capital. For this model to be true for the Naco Valley, one would expect to see household

wealth indicators decreasing with distance from the regional capital, La Sierra.

5. Do households located on differing soils show variation in occupational history and developmental cycles?

This final research question addresses the Household Wealth, Composition and Agricultural Potential models. Numerous ethnographic and archaeological studies suggest that there is a correlation between soil productivity and household composition/size and longevity of occupation. If household composition/size is directly related to soil fertility, one would expect a positive correlation between productive soils and larger households. One would also expect to see smaller households located on poorer soils. In effect, households on poorer soils will fission more often than households on better soils. One would also expect to observe, archaeologically, a longer occupation sequence at household sites located on better soils than on poorer soils. The Founder Household Model takes these arguments a step further and postulates that not only would certain large households have a longer occupation sequence on better soils, but initial and continued occupation in the Naco Valley concentrated on the best agricultural land. This model also implies that households will only occupy poor agricultural land when better regions fill up with settlement, people then being "pushed" onto less desirable terrain.

The Naco Valley, Northwest Honduras

My research was undertaken in the Naco Valley (see Figure 1.1), which comprises 96 km² along the central portion of the Río Chamelecón. The valley floor is situated some 100-200 m above sea level (Urban 1986b). The Naco Valley is surrounded on all sides by the Sierra de Omoa; the northern portion is bordered by steep slopes, while the south, east and west are bounded by gentle rolling hills. The valley is located in an area that both geographical and archaeological evidence suggests enjoyed political and economic contacts with both Maya and non-Maya areas (e.g. Schortman 1986), including the Sula Plain (Henderson ed. 1981; Joyce 1991), the middle Ulua drainage (Ashmore et al. 1987; Schortman and Urban 1994; Schortman et al. 1986); the La Entrada region (Inomata and Aoyama 1996; Nakamura 1994; Nakamura et al. 1992; Schortman and Nakamura 1991); and the Copán Valley (Fash 1983, 1991; Sanders ed. 1986, 1990; Webster and Freter 1990; Webster and Gonlin 1988; Willey, Lenventhal and Fash 1978).

Archaeological research began in the Naco Valley early in this century (Strong, Kidder and Paul 1938), but current investigations were initiated by Cornell University in 1975 (Henderson 1975, 1977, 1978; Henderson et al. 1979) and, since 1979, has continued under the direction of Patricia Urban and Edward Schortman (Schortman et al. 1992; Schortman and Urban 1994; Schortman and Urban eds. 1991a,b; Urban 1986 a,b; Urban et al. 1988; Wonderley 1981, 1986). Valley survey since 1975 (Urban 1986a,b; Urban et al. 1988) has documented settlement

patterns from the Early Formative (1250 - 800 B.C.) period until the Spanish Conquest (1532 A.D.). Major research foci in recent years have been political economy and craft specialization. My research will complement that work and give new insight into these patterns, incorporating household production strategies and soil productivity data.

There is evidence of increasing occupation in the valley in the Early Classic (300-600 A.D.). During the Late Classic (600-950 A.D.), a central political organization encompassing the valley, and possibly beyond, emerged. This hierarchically structured polity is administrated from the site of La Sierra (see Figure 1.2). The Late Classic period was marked by significant population increase. The primate nature of La Sierra, with 486 visible structures (10 times the size of the second largest center), suggests its central and dominant political position over the rest of the valley population. This evidence of political domination is supported by the nature of Late Classic settlement: over one-third of all structures dating to the period are located at the capital and within one kilometer of the site center. This latter area is referred to as La Sierra's near periphery (Schortman et al. 1992). Recent research by Schortman and Urban suggests that there was significant elite control over, and centralization of, craft specialization at the capital. This is evidenced by the presence of at least two pottery kilns, as well as numerous structures at the capital containing evidence of craft specialization. Outside of La Sierra, households in

numerous portions of the valley display craft production, albeit on a much smaller scale than observed at La Sierra.

Late Classic occupation in rural portions of the valley is continuous and scattered. In the regional capital households are densely nucleated, while in other portions of the valley most sites have relatively small numbers of structures, organized principally in patio-group arrangements.

More information on Naco Valley settlement patterns from the Middle Formative to the Late Classic Periods, as well as information on soil classifications, is presented in Chapter Two.

Notes on Dissertation Organization

The main objective of this project is to investigate the dynamics of rural, agrarian household production, wealth and composition as they relate to soil productivity. The household data used in this dissertation hail from two sources: excavations overseen by myself during the Spring of 1996, as well as data generated in past seasons of the Proyecto Valle de Naco, under the direction of Pat Urban and Ed Schortman.

Chapter Two details Naco Valley prehispanic settlement patterns, geologic history and contemporary land and resource use. After reviewing past research, I look specifically at Research Question 5. Chapter Two reconstructs diachronically how household settlement patterns relate to the quality of the soil, as well as natural resources. In this way, one may begin to understand how household settlement location decisions were

influenced by land fertility. One may also better comprehend what effect, through time, soil fertility had on the composition and duration of household occupation. This will be the only chapter that studies household data diachronically.

Chapter Three outlines the theoretical background and modeling of household organization, wealth and production necessary for the subsequent chapters.

Chapters Four and Five detail household excavations undertaken by the author and others. Detailed architectural information will be offered on occupational sequence, structure form and layout, and exterior and interior architectural design. Additionally, artifactual information on wealth and production will be explored to facilitate discussions of differences both within and between households. Chapters Four and Five will study small and large households, respectively.

Chapter Six returns to the above Research Questions. After comparing the specific household data presented in Chapters Two, Four and Five to the nature of the soil zones in which the households are found, conclusions are drawn relating to Research Questions 1 to 5. Finally, I refer back to the models outlined in Chapter One and draw conclusions about how households formed and developed in the Naco Valley during the Late Classic and how these processes compare to those predicted by the proposed behavioral models.

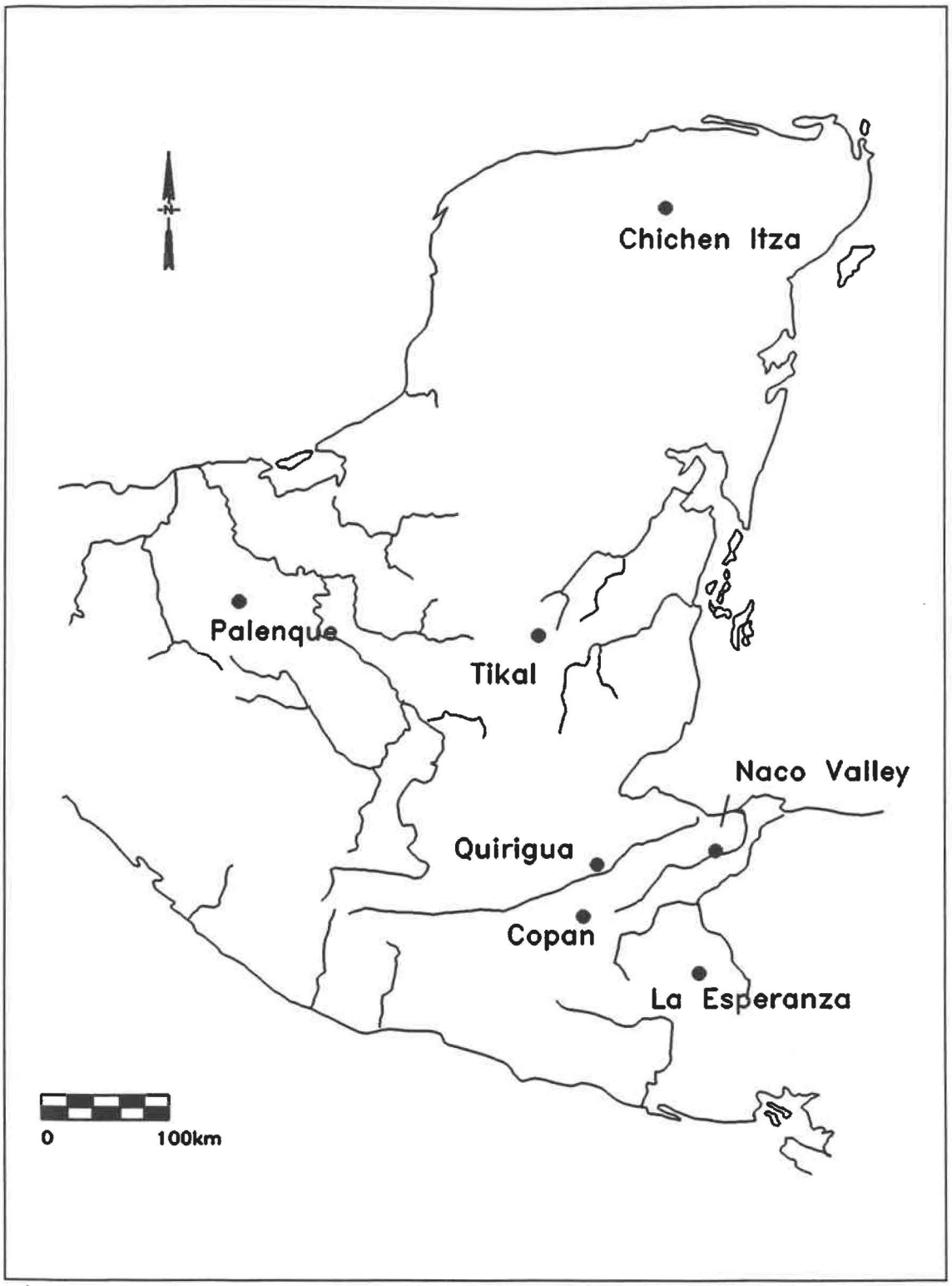


Figure 1.1 Map of Southern Mesoamerica, including Southeast Periphery.

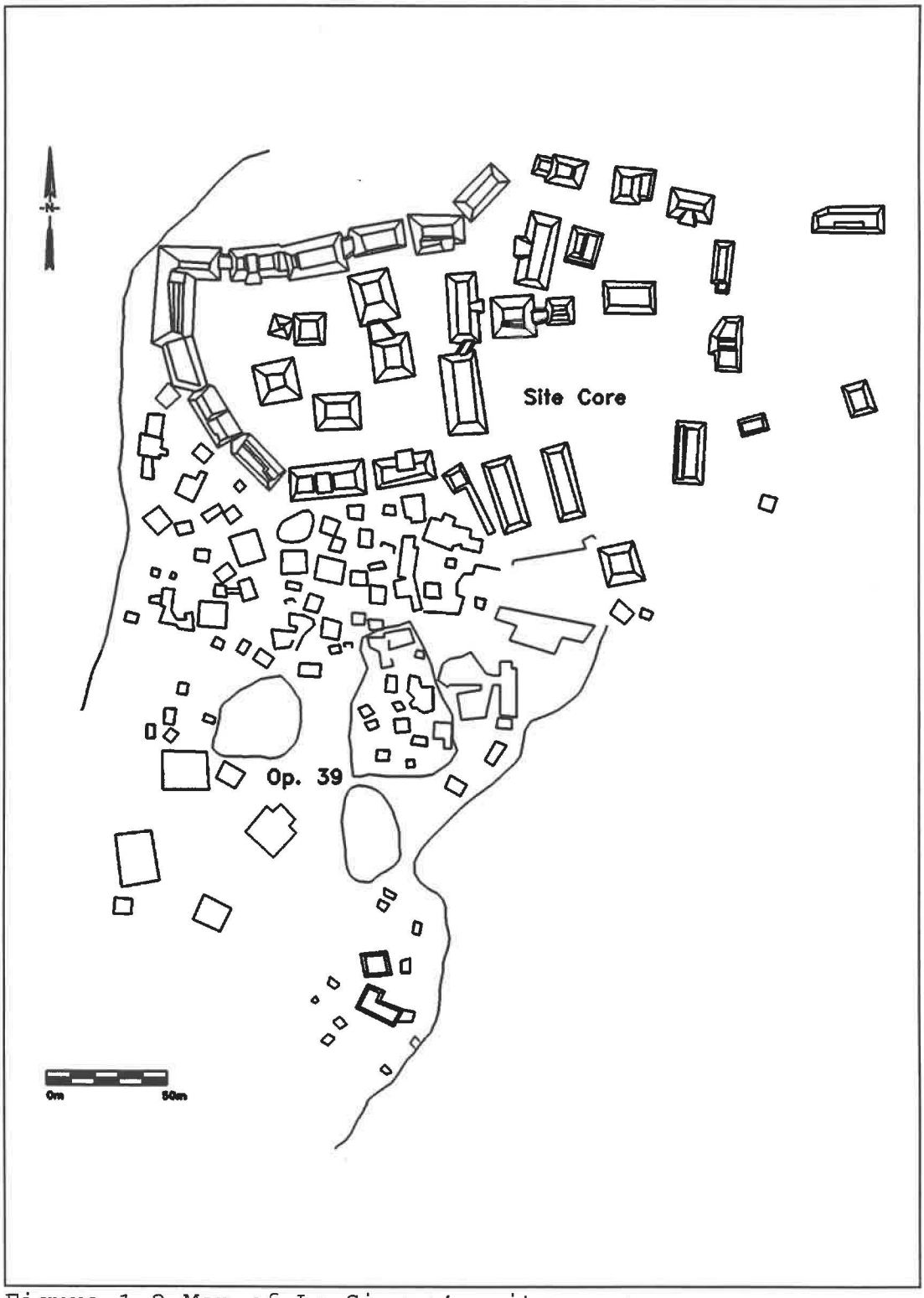


Figure 1.2 Map of La Sierra's site core.

CHAPTER TWO

SETTLEMENT PATTERNS, SOIL DIFFERENTIATION AND AGARIAN HOUSEHOLD DEVELOPMENTAL CYCLES

Introduction

Settlement pattern studies have assumed increasing importance in American archaeology since the 1940s, when Gordon Willey undertook his ground-breaking investigations of the Viru Valley in Peru (Willey 1953, 1956) and, later, the Belize River Valley, in what was then British Honduras (Willey 1965). A common definition for much current settlement pattern research hails back to Willey's dictum, "the way in which man disposed himself over the landscape on which he lived (Willey 1953:1)." Generally, this encompasses studying the interrelationship between human settlement and the physical environment. That is, how do humans place themselves on the physical landscape? What motivates humans to settle where they do? What variability in, for example, natural resources leads to differential human behavior in an area? Since those first influential studies almost fifty years ago, settlement pattern research has grown immensely, with massive studies undertaken in the 1970s guided by the principles of human ecology, notably in Mesoamerica in the Basin of Mexico (e.g. Sanders, Parsons and Santley 1979) and the Valley of Oaxaca (e.g. Flannery, ed., 1976; Flannery and Marcus, ed. 1983; Marcus, ed. 1990).

This chapter investigates several issues relating to settlement patterns in the Naco Valley. First, I study the diachronic settlement patterns of households from the Middle Formative (1000-400 B.C.) through the Late Classic (600-950 A.D.) in the valley, looking specifically at household decision-making concerning settlement location in relation to the physical environment. I discuss changes in household preferences for proximate access to natural resources, including fertile agricultural soils, water, clay and other aspects of the physical environment. Second, I explore the possible affects of differences in soil fertility on the developmental cycle of households during the Late Classic period. By utilizing settlement pattern data collected over the course of several seasons by the Proyecto Valle de Naco, I investigate whether rural agrarian households located on poor agricultural soils tend to fission more often than households located on more fertile land.

As noted briefly in Chapter One, this dissertation is primarily concerned with small, rural agrarian households. As a result, all excavation data being used has been collected from small households which, in many other areas of Mesoamerica, would be considered, part or all of, hamlets, the smallest type of settlement (e.g. Sanders, Parsons and Santley 1979:56). During all time periods in the Naco Valley studied for this dissertation, hamlets are the most common type of settlement. Hamlets encompass varied numbers of structures and are defined as settlements containing two to twenty surface-

visible buildings (i.e. larger than single, isolated structures). The buildings are constructed around one or more common patios. In the Basin of Mexico, a hamlet is categorized as a small site with less than 100 people and no evidence of civic-ceremonial architecture. Small in nature, a hamlet in the Naco Valley may contain monumental architecture, i.e. structures taller than 1.5 m. The site typology used in the Naco Valley would place these types of settlements in the lower rung of the hierarchy, tiers three through five (see Table 2.1).

Agricultural Production in Prehispanic Mesoamerica

Residents of these small, rural homesteads that dot the physical landscape are assumed to have been primarily involved in subsistence farming. Other sorts of production, such as craft manufacture, would then occupy down times in the farming cycle, such as the dry season (e.g., D. Arnold 1985; P. Arnold III 1991).

In many areas of Mesoamerica, extensive cultivation is the prevalent form of agriculture. In the Maya lowlands, extensive farming is referred to as swidden agriculture, or milpa, a Nahuatl term for a cornfield (Morley 1947:141, cited in Carter 1969:16). In this system, large areas of land are necessary, due to the short period of high soil fertility. After several years of cultivation, the level of productivity in a field drops off considerably. The tract then lies fallow for several years and a new area is cleared for production.

Extensive agriculture is defined at times by a system in which the fallow period exceeds the cropping period (1:2 or greater) (Harrison 1978:9). As a result of moving fields every several years, house and field settlement patterns tend to be highly dispersed (see Farriss 1984:125-131 for a description of prehistoric and contemporary settlement patterns practiced by northern Yucatán peasant agriculturalists).

On the southeast margin of Mesoamerica and in the Maya lowlands, intensive agriculture was adapted to increase yields, as evidenced by terraces. Terraces, allowing cultivation while minimizing erosion, increase the amount of arable land in an area (Dunning and Beach 1994). In Mesoamerica, many terraces are stone-constructions; however, Rice (1993) has suggested that perhaps there were other, less permanent, types of terraces, such as earthen berms. Such berms would have served a similar purpose to stone terraces, but with less labor input. These berms, however, are as yet undocumented in most areas of the Maya lowlands.

In the Naco Valley, during all prehistoric time periods, the evidence suggests that the primary production systems in place were extensive in nature. Swidden agriculture would have been the dominant form of subsistence farming, as it is today among peasant households in many areas of the valley. While there have been several terraces documented on the southern edge of the valley (E. Schortman, personal communication 1995), they are an anomaly. No other evidence of intensive agriculture has been noted in Naco. Schortman (personal

communication 1997) believes that terracing was restricted in the valley because Naco hillslopes, with the exception of those on the southern edge, are too steep for terracing.

Throughout prehistory in the Naco Valley, settlement outside several primate regional centers is best described as dispersed in nature, with little settlement clustering above the level of the extended household (see below). In addition to cultivated fields near settlements, ethnographic (e.g. Killion 1992) and archaeological (e.g. Sheets 1992) evidence suggests that rural households in the Naco Valley could well have had kitchen gardens located directly adjacent to the residence for vegetables and other complementary crops.

Agriculture, Soils and Settlement Patterns

Land use may have significantly affected household settlement patterns (Ford 1986:77). In Mesoamerica, agricultural households might well have placed themselves on the physical landscape in widely dispersed patterns to facilitate access to water or specific soil types (Farriss 1984:127). Ethnographic studies of Kekchi cultivators in the Guatemalan lowlands, for example, suggest that agrarian peasants are very aware of soil quality and classify it primarily based on considerations of crop yields (Carter 1969:21).

In some regions there may have been complex systems of infields and outfields, with outfields located some distance from residences (e.g. Netting 1977). However, it is suggested

here that in the Naco Valley, due to large tracts of space between settlements in rural areas even during the Late Classic population florescence (600-950 A.D.) (see below), many households would have had adequate opportunity to farm in the immediate vicinity of their residences. Farmers tend to live close to the land they cultivate (Fedick 1989). While agriculturalists may do this because their crops need considerable care, perhaps a more important reason is that residential occupation could allow or increase individual control over land (Smith 1972:415). If farmers reside in close proximity to their fields, the quality of the soils adjacent to rural households would have affected not only crop production, but the social dynamics of the household; for example, the distribution of land to offspring would be influenced by the quality and distribution of that land. Urban dwellers in La Sierra's core and near periphery may have had to walk considerable distances to get to their fields. The physical environment is seen here as shaping different possibilities for households and influencing their choices, rather than defining or dictating them (Farriss 1984:127).

Soil and settlement pattern studies have been undertaken in other areas of Mesoamerica over the past thirty years with interesting results. In the Basin of Mexico, Sanders, Parsons and Santley (1979) explained settlement patterns in early periods as related to household subsistence strategies. From the Early Horizon (1500-1150 B.C.) through the First Intermediate, Phase Three (300-100 B.C.), there is settlement

clustering in the southern portion of the basin, which has a high production potential for rainfall agriculture. While there was settlement in the drier, and thus agriculturally riskier, northeastern portion of the basin, settlement developments here were marginal compared to those occurring in the south during early periods. Households during early periods focused their energies on areas where there was the best chance to avoid subsistence failure.

The Valley of Oaxaca in southern Mexico illustrates a different approach to household decision-making relating to agricultural pursuits. In the Basin of Mexico it has been proposed that the central focus of settlement was related to agricultural pursuits. Valley of Oaxaca settlement patterns follow different trajectories. Research into the connection between soil productivity and settlement (see Kirkby 1973; Feinman and Nicholas 1987, 1990) shows that from the Tierras Largas (1500-1150 B.C.) to Rosario (600-500 B.C.) phases, households did not settle consistently either immediately adjacent to, or directly on, the most productive agricultural land in the valley. Early villages were located near relatively good agricultural terrain, however these areas did not constitute prime agricultural fields. Monte Albán was founded on, and surrounded by, lower quality agricultural land (but see Sanders and Nichols 1988 for a rebuttal to this) and plots of prime agricultural land remained under-utilized. Household settlement patterns in the Valley of Oaxaca during

these early periods demonstrate that prime agricultural land was not an inevitable draw to agrarian occupation.

In the Belize River Valley (Fedick 1989; Fedick and Ford 1990; Ford 1986), settlement patterns suggest inconsistent household relationships to agricultural pursuits. Certainly, in this region there is a link between the natural landscape and settlement, with topography affecting settlement distribution (Ford 1986:69) (see Wingard 1992:119 for a similar view for Copán). Slight and moderate relief is more appropriate to agricultural pursuits and supports the largest clustering of settlement. However, household decision-making took account of more than soil fertility and drainage. During the Middle and Late Formative periods, households tended to settle near fertile alluvial soils and increased their labor investment in domestic architecture. However, during the Early Classic, population was drawn away from prime agricultural land and towards regional political centers. By the Late Classic, this earlier trend was reversed and households returned to high quality soils, suggesting that soil qualities eclipsed proximity to regional centers as a factor determining household location. During the Late Classic there was a substantial increase in settlement density on fertile agricultural soils.

Naco Valley Soils

This section reviews the geomorphological work of Kirk Anderson (1994), who, in 1992, undertook a study of soils in

the Naco Valley to map their characteristics and evaluate their respective fertility, as well as to understand the recent and ancient geological history of the valley. One hypothesis tested during the course of his work was that the depopulation in the valley at the end of the Late Classic (600-950 A.D.) was due to environmental degradation.

Anderson (1994) concluded that there are differing qualities of land in the valley, ranging from excellent to extremely poor, but in general terms the overall soil quality is good for agriculture. The gently rolling schist and limestone hillsides surrounding the valley and the broad, slightly sloping alluvial plain are joined to form young, relatively unweathered soils and sediments among the many tributaries entering Naco and flowing into its main river, the Río Chamelecón. This characterization, Anderson states (1994:96), is contrary to the classic concept of tropical soils as deeply weathered and containing only basic nutrients near the surface, due to decomposing vegetable matter.

Anderson created a soil map for the valley, dividing it into eight soil great groups and three broad soil orders: Mollisols, Entisols and Oxisols (see Table 2.2). In general, Mollisols, which are grassland soils, and Entisols, young soils, are good agricultural soils, while Oxisols are among the poorest known. In the valley, Mollisols represent approximately 80% of classified valley portions. According to Anderson, one of the only limitations to agriculture in the Mollisols is water availability.

The broad soil order Mollisols in the valley is subdivided into six different soil great groups (Arguidoll, Calcic Ariudoll, Haplustoll, Typic Hapludoll, Hapludoll and Hapludoll/ Argiudoll) (see Soil Survey Staff 1975:86-87, 271-322). Mollisols are mainly very dark-colored, base-rich soils that were either forested or grass-covered in the past. When temperatures are warm and slopes are not steep, modern crops grown on Mollisolls in dry climates may include grains and sorghum, while in warm, moist climates corn and soybeans are usually represented.

Anderson characterizes the Mollisols in general as very good agricultural land. However, there are differences in fertility in this soil order. Specifically, two small regions of the valley contain the highest fertility (see Figure 2.1). The first, located in the southwestern portion of the valley, is the Lomas de Jícaro, an extensive limestone hillside. Due to downwashing of decaying limestone from its upper slopes, the soil at the base of this hill, near Sites 112 and 267, has the highest fertility rating on the western side of the Río Chamelecón. The second is located in the southeastern portion of the valley, on the east side of the Río Chamelecón. Here, near Site 262, the downwashing of material from a similar small hill makes this location ideal for agriculture.

Mollisols are not unique to the Naco Valley. Recent publications from the Belize River Valley (Fedick 1989, Fedick and Ford 1990) and the lowland Maya Copán Valley (Wingard 1992) offer soil classifications including Mollisols. In

general, they are the dominant soil type in the Maya lowlands (Fedick and Ford 1990:20). In the Belize River Valley, specifically, they represent a prime land resource with favorable returns in crop yields. Mollisols are not "typical" tropical soils due to their potential for good agricultural returns with the proper cultivation (Fedick and Ford 1990:28).

A second soil order found in the Naco Valley is Entisols (great group Mollic Udifluvent). Entisols are newly formed soils that characteristically do not contain horizons. Many times this lack of horizons is due to insufficient time for their development (Soil Survey Staff 1975:179). Entisols are normally located in flood or alluvial plains that receive new alluvial deposits frequently. These soils are located, as expected, along the river terraces of the Río Chamelecón, situated in the center of the valley, as well as along the river terraces of the Río Manchaguala, in the northwestern portion of the valley. While normally one would expect these newly-laid soils to be nutrient rich and fertile, only the former is true in Naco. Due to a lack of sufficient rainfall to leach high salts and calcium carbonate from these soils, there is a potential problem with the fertility of Entisols (Anderson 1994a:151).

The questionable fertility of the Naco Entisols contrasts dramatically with other areas of Mesoamerica. In the Belize River Valley, Entisols, associated with deep alluvial soils, are considered prime agricultural land (Fedick and Ford 1990). In comparison, Naco Mollisols, located in the middle and upper

piedmont, contain fewer nutrients than the Entisols, but are more fertile than Entisols along the two largest rivers in the valley (Anderson 1994:135, 143).

Finally, a third broad soil order in the Naco Valley is the Oxisols (great group Eutrudox), located in the northwest portion of the valley. These soils, formed locally from oxidized schist parent material, are very red, although in general they tend to be reddish, yellowish or grayish (Soil Survey Staff 1975:323). Usually located on stable surfaces, many Oxisols have deep weathering and are completely featureless. Without clearly marked horizons, Oxisols disallow non-arbitrary boundaries. Without additives, most Oxisols have low agricultural productivity. Due to their poor soil fertility, Oxisols generally lack good ground cover, which may lead to deep soil weathering. In the Naco Valley, the Oxisol area is characterized as more stable than surrounding areas (Anderson 1994), perhaps leading to increased weathering, compared to neighboring zones.

While there are numerous soil great groups and orders in Naco, broad generalizations about soils in the valley will make it easier to recognize patterned associations among settlements, results of household excavations and soils. Three general soil classes are used in this dissertation, based on consultation with Kirk Anderson (personal communication, 1997) (see Table 2.2):

Class I: Mollisols	Very Good Fertility
Class II: Entisols	Moderate Fertility
Class III: Oxisols	Poor Fertility

On Class I soils, as noted above, there are also two locales of prime agricultural land with the highest fertility in the valley.

As was recorded in the Basin of Mexico, soil fertility is certainly not the only variable responsible for the success or failure of agricultural production. There, for example, settlement patterns in the early periods were strongly influenced by rainfall (Sanders, Parsons and Santley 1979). Anderson (1994) also states that an important factor determining agricultural production across Class I soils is availability of water. In the Naco Valley, local rainfall variability is minimal. Distance to perennial and seasonal watercourses, however, may have affected household decisions on settlement location during various time periods (see below).

Natural Resources in the Naco Valley

Obsidian is the most desired material for making chipped stone tools in Mesoamerica in general, and this was especially true for the lowland Maya area. The two primary obsidian sources used by Naco residents are the Ixtepeque and El Chayal flows. All obsidian was imported into the valley (for a

detailed report on obsidian analysis in the Naco Valley, see Ross 1997).

Local raw material suitable for making stone tools consists of perlite and chert. In the southwestern portion of the valley, along the Quebrada Guasma, as well as in other nearby river beds, deposits of perlite are found in ignimbrites, a form of volcanic stone formed from eruptions containing significant amounts of hot gas and dust (Anderson 1994:99). Perlite, like obsidian, tends to appear in nodules less than five centimeters across. The diminutive nature of perlite dictates its use in microtools. Easy access to these types of volcanic materials in Naco contrasts with many other lowland areas, where long-distance trade is necessary for access. Chert, another widely used local material, is found in large limestone outcroppings in the valley. The Lomas de Jícaro, one of the areas noted as most fertile in the valley, is a major source for chert, as well as limestone that was shaped into masonry blocks. Vesicular basalt outcrops in the southern portion of the valley, along both sides of the Río Chamelecón, most likely served as sources for the primary material used to make grinding stones, such as manos and metates.

A clay source study in 1991 by Sam Connell (UCLA) and Stephen Yates concluded that there are varying degrees of clay quality in the valley. Nevertheless, this material is so abundant that during the Late Classic no site was located farther than 0.5 km from a useable clay source. Clay deposits

underlying the Late Classic capital of the valley, La Sierra, are among the finest, as defined by contemporary potters, and most sought after. However, excavations at rural households suggest La Sierra did not monopolize access to clay in the valley. Instead, households could have produced their own ceramic crafts, when needed, from nearby sources (Schortman and Urban eds. 1992: 22). These sources vary both in clay quality and applicability for producing specific ceramic items. For example, clay from La Sierra is sought after by modern potters for figurine manufacture (Schortman and Urban eds. 1992:27-28). Overall, due to differences in quality, modern potters favor certain sources over others. Instead of using clay deposits in the vicinity of their residences, potters will travel some distance to collect the desired clay. While this is the case, it is important to remember that households, both in prehispanic and modern times, have relatively easy access to clay sources.

Household Settlement Patterns: Middle Formative (1000-400 B.C.)

The Middle Formative Period is not well represented in the valley. A total of 11 households have been identified for this period, eight located on classified soils (see Figure 2.2, Table 2.3). The full extent of occupation during this period is not well understood. While some locations have clear, defined occupations with associated architecture, in other cases little more is found than several sherds or other

artifacts diagnostic of this period. In these latter situations, Middle Formative occupation is usually recovered below, or mixed with, Late Classic materials. At one site, Middle Formative occupation was identified buried under a meter of overburden in a quebrada cut.

The lack of distinct, in situ, occupational remains, as well as the small number of households associated with this period, may reflect a lack of permanent settlement and high mobility among some Middle Formative households. In cases of high mobility, households will invest less labor in buildings because of the relatively short expected uselife of these structures (see Fedick 1989; Flannery 1972; McGuire and Schiffer 1983).

However, even during this early period there is clear evidence of residential permanence among some households. At several Middle Formative sites, households constructed large earthen platforms, some of which are the highest found in the valley dating to any time period (> 4 m high). While some of these larger mounds may be civic architecture, there is no evidence to suggest they were not residences. Some households during this period, therefore, appear more permanently settled than others. Those households that resided on large earthen platforms were able to mobilize substantially more labor than others, which may indicate some wealth or status differentiation.

There appears to have been a clear strategy among Middle Formative households to maximize their access to natural

resources. The majority of households are settled along permanent watercourses. All eight households located on classified soils are on the best agricultural areas in the valley (Class I), none in more marginal agricultural zones (Classes II and III) (see Table 2.3). Middle Formative households also occupy the two distinct areas of prime agricultural land in Class I soil. Clearly, while occupation on classified valley soils is scant, as evidenced by only 0.12 structures per km² on classified soils (see Table 2.3), households favored close proximity to fertile agricultural land and easy access to water.

Late Formative (400 B.C.- 150 A.D.)

The Late Formative in the valley witnessed a population decline from the Middle Formative, with a total of only four households identified for this period, of which two are located on classified soils (see Figure 2.3, Table 2.4). There are only 0.06 structures per km² on classified soil areas, half the density of the previous period. There are fewer households than previously, but all four household locations were previously occupied. Households during the Late Formative preferred good agricultural land, a pattern continued from the Middle Formative, as witnessed by no occupation on Class II or III soils.

Evidence of occupational permanency during this period is variable. While all four Late Formative homesteads were occupied previously, only Site 123, located in the

northwestern portion of the valley, above the Río Manchaguala, contains monumental architecture. The dearth of observed household occupation during this period, save at Site 123, may indicate a general, relative impermanence of occupation. In some cultures utilizing swidden (extensive) agricultural practices, settlement instability will prevail (Harris 1972:249). If the areal extent of open space in the valley during these periods gave the impression of limitless land, householders may have thought that it was more economical to move on to new spaces than to settle and invest heavily in any given area (Wingard 1992:187). If so, this may be reflected by the lack of considerable labor invested in enhancing a specific area's agricultural potential (Boserup 1990).

Early Classic (150-600 A.D.)

One salient observation for the Early Classic is the increase in household occupation during this period (see Figure 2.4, Table 2.5). The Early Classic sees a considerable jump in the number of households located on classified valley soils, from two in the Late Formative to 21 during the Early Classic. Overall, there is significant increase in frequency of structures per km² on classified soils, from 0.06 in the Late Formative, to 1.23 during this period. While the vast majority of households occupy Class I soils (19 households), maintaining an earlier trend, for the first time households are located on less fertile soils (Classes II and III). Their structure frequency, however, is much lower than that

witnessed for Class I soils (see Table 2.5). In the most fertile soils, there is a return during this period to the two areas classified by Anderson (1994) as the most fertile in the valley. Although there are exceptions, settlement is generally along perennial and, what are today, seasonal watercourses.

During the Early Classic, household settlement patterns do not suggest that there was significant pressure for households to move into more marginal agricultural land. The single examples of households located on Class II and III soils represent pioneering settlement. Settlement on Class I soils during this period, compared to the subsequent Late Classic (see below), was sparse. There is no indication that more fertile soils were filled to capacity. There were still vast open areas of Class I soil available during the Early Classic. Certainly on a much smaller scale, Naco Valley Early Classic settlement patterns are, however, reminiscent of the Formative period in the Valley of Oaxaca, when less productive soil was occupied prior to the filling up prime agricultural land.

It is probable that households were farming fields close to their settlements; Early Classic settlement patterns suggest that even households living on more marginal soils may have farmed better quality land nearby. The household located on Class III soil, for example, is situated roughly 0.5 km from the margin of this zone, adjacent to more fertile, Class I soil. During this period, however, settlement patterns still suggest that there was no great need for households to venture

far from their homestead to farm. Settlement density during the Early Classic was very sparse and there was ample space for cultivation around all sites in the valley.

Late Classic (A.D. 600-950)

Household settlement patterns during the Late Classic florescence differ significantly from what was observed during earlier periods (see Figure 2.5, Tables 2.6 and 2.7). Perhaps most fundamentally, occupation during the Early Classic in the center of the valley became, during the Late Classic, the setting for La Sierra, a primate civic-ceremonial center. La Sierra was an urban node, with 486 structures in its core, and an additional 145 structures located in its near periphery. Therefore, discussions of settlement patterns during the Late Classic have been divided into urban (La Sierra and its near-vicinity) and rural (outside of La Sierra and its environs) settlement.

In rural areas, Class I soils are much more heavily occupied than previously, with 106 households located on these very fertile agricultural soils. Settlement density now reaches 11.48 structure/km^2. Households during this period continued to occupy the most fertile areas of the valley, on both sides of the Río Chamelecón, around Sites 262 and 267.

During the Early Classic there was scant occupation of less fertile soils. In contrast, Late Classic rural occupation is much heavier on soil Classes II and III. Class II soils, located along riverine bottom lands, contain a total of seven

households, with a density of 7.18 structures per km². The least fertile Class III soils have much denser occupation than their Class II counterparts, evidenced by 18 households in the small area covered by these soils. The resulting density of 22.08 structures per km² reflects considerable increase in settlement on Class III soils. Generally, occupation is much heavier during this period in rural areas. Outside of La Sierra, which is very densely settled, there are still zones with light settlement, with nodes of more dense occupation surrounding secondary centers. (see Schortman and Urban 1992:53, Figure 3.1).

Settlement, as measured by the density of structures per km², was similar in the most fertile soils (20.16) to those in the least fertile (22.08) (see Table 2.7). In fact, the density was actually highest in the worst, Class III, soils. Chi squared analysis of proportions of structures on each soil class, combining both rural and urban settlement, indicates that the difference between survey results and expected results is highly significant (chi squared = 64.1534, $p<0.001$). Class III soils are occupied much more heavily than would be expected if structures were evenly distributed across all soil classes.

This pattern is even stronger in rural areas, if primate La Sierra, and its related near settlement, is excluded (see Table 2.6). In rural areas, the density of occupation on Class III soils is virtually double that on Class I soils. The difference between the survey results and expected results for

both households (chi squared = 15.698, $p<0.001$) and structures (chi squared = 59.088, $p<0.001$) is highly significant. It is extremely unlikely that the samples of, respectively, households and structures were taken from populations where, respectively, households and structures were evenly distributed across soils of differing fertility.

A closer investigation of the differences between observed and expected results can be undertaken with the aid of Figure 2.6. Figure 2.6 illustrates similarity between the observed and expected proportion of household settlement on Class I soils, but a much lower proportion of observed households on Class II soils and a much higher proportion of observed households on Class III soils, compared to the expected proportions. For Class II soils, one could state with very high confidence that it is highly unlikely that the proportion of households observed came from the population of expected household proportion. This could indicate that Late Classic rural households avoided settling along river bottoms. However, Anderson (1994) has observed that increased flooding during the latter portion of the Late Classic, may have buried earlier occupations along the Ríos Manchaguala and Chamelecón. With this in mind, it is quite possible that Late Classic (and certainly earlier) occupation may not be visible on the surface, and are under-represented in settlement pattern data.

Middle and Late Formative households appear to have favored easy access to perennial and, what are now, permanent water courses. If Late Classic household remains were buried

during more recent flooding, it is quite possible that the remains of earlier periods are also under-represented due to these same formation processes. While settlement close to water courses offers many benefits, one need look no further than the recent impact of hurricane Mitch in Honduras to understand the severe costs associated with this occupation.

Additionally, Figure 2.6 illustrates that there is more than double the proportion of observed households located on Class III soils than would be expected if soil quality were not a factor in settlement location. One can state with very high confidence that it is highly unlikely that the sample of observed household proportion came from the population of expected household proportion. This indicates that Late Classic households did not distribute themselves evenly across soil zones, nor did they avoid poor agricultural soils. If rural households did take soil fertility into account in choosing their settlement location, one might expect that the proportion of observed rural households on Class III soils would be less than the expected. Rather, there is more. There is high confidence that rural household settlement location was not significantly negatively affected by the poor fertility of Class III soils.

Household Structure, Household Developmental Cycle

There is little explicit description in colonial documents of contemporary household structure of Maya and Maya peripheral groups, such as those in the Naco Valley. However,

ethnographic work and colonial documents from the Maya lowlands suggest that the extended family was the basic unit of lowland Maya society (Farriss 1984:132; see Wilk 1988). Extended family units consist of several generations of people, related by biological or fictive kin ties, who live and function as a cooperative and reciprocal economic unit. The fundamental activities of extended families are economic in nature (Sahlins 1957): they are basic units of production and consumption (Goody 1972). Cooperative behavior among extended family members in prehispanic southern Mesoamerica may have primarily related to agricultural pursuits. Among swidden agriculturalists, it is easier and more efficient to harness the help of family members in preparing, maintaining, and harvesting crops than to perform these tasks individually (Farriss 1984:133-4; Wilk 1991:180-203). While there may be economic pooling of resources in extended families, this is not always the case (Wilk 1991:209). However, others see a primary focus of extended household activities as related to pooling (Sahlins 1957).

The extended family among the prehistoric and contemporary lowland Maya was a co-residential, as well as a cooperative, unit. Dwellings containing several generations of families were/are normally constructed around a central patio, where daily economic and social activities were/are performed. These households are recognized in the archaeological record by their physical remains, including the house foundations and other materials left behind. The physical signatures of

ancient extended households are commonly referred to as "plazuela groups", "household clusters", "patio clusters" (Ashmore 1981), "house compound clusters" (Sanders, Parsons and Santley 1979:311), or "household units" (Flannery 1983:45).

Families normally go through what is termed a developmental cycle (Fortes 1958; Goody 1958, 1972). The phrase refers to a process through which the domestic group size waxes and wanes with the evolution of the family, growing, shrinking and perhaps dissolving at different stages (Goody 1958:53; for archaeological correlates, see de Montmollin 1989:184-188; Haviland 1988; Tourtellot 1988). In most instances, the developmental cycle will entail at least three generations of the domestic group. Two processes are involved in the developmental cycle. First, as families grow in size and children of the founding parents form their own families, many times the household will segment. During this phase, the new generation internally subdivides and creates a new domicile adjacent to one set of parents. This process is sometimes referred to as "cleavage" (Goody 1958:58). Among the modern Kekchi Maya of southern Belize, segmentation may occur in a year or two of marriage, once the first child is born (see Collier 1975; Wilk 1991). Second, an extended family may fission, dividing into separate, distinct groups away from the original domestic group. In this case, many times the extended family dissolves. The preserved settlement pattern is the expression, at any given time, of the developmental cycle.

That is, the maximum number of structures observed represents the maximal development of the extended family (de Montmollin 1989:184-188; Haviland 1988; Tourtellot 1988).

Extended family social organization, in effect, relies on continuous assessment of situations. There are many positive aspects to extended family life, such as reciprocation and cooperation among household members needed in times of incompatible activity requirements (see Pasternak, Ember and Ember 1976). Still, the reasons why households may fission are numerous. The closeness of relationships may lead to the family's ultimate destruction. The social structure of the extended family contains more possibility for conflict than simple nuclear families (Pasternack, Ember and Ember 1976).

Family fissioning might occur because of jealousy, personal disagreement, or dissatisfaction with future inheritance. Wilk (1991:209) suggests that, among the Kekchi Maya of southern Belize, household fissioning occurs at times when there is a dissatisfaction over labor-exchange balances. That is, some family members may be perceived as not performing their required tasks. This may be one disadvantage to labor pooling. Jealousy and competition among extended family members can also be related. Wilk (1991:213, Table 10.1) argues that domestic units may fission if a husband perceives there is competition for his wife. Certainly, when family members live in close proximity to one another, jealousy may occur. If the founding household is wealthy, offspring who are assured an attractive land inheritance might

continue to reside with the household. On the other hand, if there is little good land or other wealth to reap in the future, offspring may leave, fissioning the extended household (Wilk 1988, 1991; Goody 1972).

Households can also fission when all household functions are fulfilled. Sahlins (1957) documents extended families in Moala, Fiji that fission on average every 40 years because there is a full complement of members necessary for carrying out extended family activities. Both Smith (1972:415) and Goody (1958) offer similar views, suggesting that there is a point when households just become "too large" and fission. While in these two latter cases no definitive reason for fissioning is offered, Sahlins's observation of the limited functions of households may be the answer.

The Household Developmental Cycle: A Case Study

An example of a modern household in the Naco Valley provides a better understanding of the operation of the developmental cycle. A local informant, whom I will call Don Juancito, is also an older gentleman, close to 80 years old. Don Juancito, until recently, was moving every few years in a town in the Naco Valley, renting small houses; he had never had enough money to buy a home. As well, he was not born in the Naco Valley, but immigrated to the valley about 20 years ago from near the El Salvador border. Unexpectedly, several years ago he won L. 50,000 in the lottery and decided to invest his money in a small open lot in the growing town. In

several months, he planted fruit trees, dug a latrine, and constructed a one-room house out of cement blocks for himself and his wife. While their house was the original domicile on the lot, in two years, two additional houses were constructed by a daughter and a granddaughter.

Within Don Juancito's household, wealth was not evenly distributed among members and was apparent in household items and house design. The informant's daughter was wealthier than her parents. As a result, the house of his daughter was constructed more elaborately, was adjacent to the road, and was plastered and painted on the side facing the road. The other houses were simply finished and set further back on the property.

This example of the household developmental cycle in the modern Naco Valley offers insight into how the cycle may or may not be operationalized in an archaeological context. Here, a homestead grew from a single founding residence to multiple residences containing three generations. There is still room for several more families and their respective houses, if necessary, within the boundaries of the property.

There are distinct differences in the wealth of different household members that may not only be observed in the possessions of the individual families, but in the design and decoration of the residences. In Don Juancito's household, his daughter has a job in San Pedro Sula and is wealthier than the other members of her household. Her house is more finely finished and relatively larger than the other residences in

the compound.

This contemporary example also highlights the importance of resources in attracting and holding household members. Don Juancito's sudden "wealth" resulted in people activating social ties to create a social/residential unit that would not have existed otherwise. His daughter and granddaughter had earlier fissioned off from the household, creating their own households. After his lottery winnings were realized and he bought his own property for the first time, his daughter and granddaughter rejoined the household, although maintaining distinct residences (internal segmentation). Potential (and actual) household members make decisions about where to live, and with whom, in part based on what assets are available.

The Role of Soil Fertility in the Developmental Cycle

Examination of extended family household organization in the lowland Maya area allows characterization of these households on several levels. First, as has been observed, the majority of prehistoric agrarian households were extended families whose members farmed in the general vicinity of their settlements. Second, these households tend to shrink and grow at different stages in their developmental cycles. Finally, some households, for a variety of reasons, may tend to fission earlier than others, thus dissolving the original household.

In agrarian societies, fertile agricultural land is the most important single resource, perhaps second only to access to water, in determining household success and size. After

all, without water, otherwise bountiful land cannot produce crops. Studies of corporate households have shown that the availability of good land is a determining factor in lineage strength (Hayden and Cannon 1982:150). Household size may also be determined by quality of land inheritance (Wilk 1991). I propose that the availability of good agricultural land may be a factor in determining when extended households fission. If agrarian extended households are located on poor agricultural soils, it is possible that they will fission faster and more readily than those located on better land because poor fields are undesirable to inherit. Furthermore, there may be fewer resources on less fertile soils to attract clients in search of land.

Testing the Hypothesis: Methodology

If rural households on good agricultural soils segment more readily and fission less often, on average, than rural households on poorer agricultural soils, one would expect to see larger rural households on the best agricultural land in the valley. Rural household size on the best soils would result, in part, from their being consistently further along in the developmental cycle than rural households located on the least fertile zone in the valley. Therefore, the two variables studied for each household are the total number of structures associated with the rural household and the soil zone it occupies (Classes I, II or III).

Rural household settlement data from the Late Classic (600-950 A.D.) is used in this study. Because of the political significance of La Sierra, with its forced urban settlement, it is assumed that household size may not be as determined by soil quality in the near vicinity of La Sierra as it may be in rural areas. At La Sierra, segmentation may have been enforced politically from above, just as fissioning may have been precluded by elite fiat. Therefore, only rural households located on classified soils are studied.

Household size is determined from settlement pattern survey data by studying both the total number of structures at a site, as well as their location in relation to one another. A household is defined by a cluster of structures if the structures are within 50 m of one another. Extended family households may locate on the landscape in two ways: as residential, extended family households, where structures occupied by household members are nucleated; or as non-residential, extended family households (or loose clusters [Wilk 1984, 1991]), where structures occupied by members are dispersed over a localized, or possibly extended, area (Nutini 1968:191-247). If there are two or more clusters of structures within 50 m of one another, they are considered members of the same household. Clusters of structures close to one another may be the result of household segmentation. Proximity of structures (a tight cluster) implies cooperative, close relationships between household members (Wilk 1984, 1991). If clusters of households are more than 50 m apart, they are

interpreted as non-residential, extended family households and, therefore, separate cases. During survey of the valley, multiple clusters of structures may have been given the same site number if they were located less than 150 m apart. Therefore, in a single site location, there may be a single household or multiple households.

It is important to note that this methodology is different in its interpretation of household size than that used by others studying the developmental cycle of households (e.g. de Montmollin 1989; Haviland 1988; Tourtellot 1988). This is partially due to the nature of rural households, where settlement is dispersed. In several of the above studies (Haviland 1988; Tourtellot 1988), urban households were studied, where settlement is nucleated and patio groups are adjacent to one another. Therefore, I did not use the distinction simply of patio-groups as households because in rural areas, two adjacent (or relatively close) patio-groups may function as one large extended, multi-family household, while in urban areas this spacing between patio groups may be much more a function of political forced settlement. In sum, the nature of settlement between rural and urban areas is differentiated enough to make this distinction for the Late Classic Naco Valley appropriate.

Results

Box-and-dot plots of the original rural household data from the three soil classes were plotted and indicate that

there were sufficient outliers in both Class I and III soils to necessitate trimming the samples from each soil class. A 10% trimmed batch was decided upon, although there were still outliers on Class III. However, because of the small number of households on Class II soils in the original sample (seven), more than a 10% trimmed batch would have disallowed meaningful comparison of household sizes between soil classes because the error ranges would have been too large.

Analysis of Figure 2.7 illustrates several important differences between rural household size on different qualities of soil. Households on Class I and II soils appear, based upon the box-and-dot plots, to be fairly similar, while they both are very dissimilar from households on Class III soils. While the median household size is virtually identical between households on all three soil classes (5 for Classes I and II, 4.5 for Class III), the range of rural household sizes in Classes I and II is much more extended than in Class III. Class III, for example, has a normal distribution range of only three to five structures per household, with several outliers indicated. Class I rural households, however, contain no outliers and a normal range from 2 to 15 structures. Therefore, based on the box-and-dot plots, it appears that rural households on Class III soils are much more limited in their overall size variation than those on either Class I or II terrain. Households on both of the latter two soil types have more extended ranges and variations of household size. This may suggest younger households.

Analysis of Figure 2.8, confidence levels of 10% trimmed mean rural household size on each soil class, indicates that households on Classes I and II appear to be more similar to one another than to those on Class III. This patterning confirms the results illustrated in Figure 2.7. However, the very large error ranges for 10% trimmed mean rural household size in Class II soils makes it difficult to have much confidence in comparisons between Class II and either Class I or III. Analysis of variance of the original sample of rural households indicates that observed differences in mean rural household size on different soil classes in the Naco Valley are not very significant ($F = 0.589$, $p = 0.556$). Combining together the different analyses, one cannot be very confident that there are any real differences in trimmed mean rural household size between different soil classes. Therefore, it appears likely that mean rural household size was not affected by differences in soil fertility. This may suggest that there was a standardized household size, or module, that was achieved throughout the Late Classic valley. This idealized household composition/size may have been dictated by labor needs that did not vary with the quality of the soil farmed.

Hypothesized Catchment Areas

The analysis above is based upon the assumption that household members will farm, and have the majority of their fields, within the immediate area of their settlement. If settlement is dispersed, as it was in the Late Classic Naco

Valley, this is a reasonable assumption (see Drennan 1988). Ethnographic and archaeological studies have shown that many rural households in Mesoamerica will, for example, have kitchen gardens near where they reside (e.g. Killion 1992; Sheets 1992).

However, this may not always be the case. While there is no direct evidence of this, rural farmers in the Late Classic Naco Valley may have had an infield/outfield system of cultivation (e.g. Netting 1977), where different crops are located near the homestead and at a greater distance. If farmers cultivate further than the immediate area around their homes, and these fields are inheritable, then this may affect household members' decisions about staying or leaving their household. In this case, the land immediately adjacent to the homestead may not affect the developmental cycle as much as if farmers cultivated exclusively around their settlements.

Ethnographic studies of contemporary farmers suggest that, for those households using an infield/outfield system, those more distant fields are normally three to five kilometers from the residence (roughly 45 minutes walking distance) (Killion 1992; Wilk 1984). While there is no direct evidence to suggest that a similar practice was in place in the Late Classic Naco Valley, this may explain why household density on Class III soils is so high compared to other areas of the valley; some households lived on this infertile land but farmed elsewhere. As illustrated in Figure 2.9, most household farmers settled on Class II and III soils could

reach more fertile areas of the valley within three kilometers.

Several areas of the valley, including Class I soils bordering on Class III soils, near Site 386, and the fertile pocket near the base of the Lomas de Jícaro, adjacent to Site 267, appear to be conspicuously light in settlement. Perhaps these areas were controlled by elites at La Sierra or elite households elsewhere in the valley for the use of specific farmers. Certainly, inhabitants of La Sierra would have had to walk some distance to their agricultural fields. Those areas to the north and southwest of La Sierra which are devoid of settlement may have been farmed by urban dwellers.

Conclusions

This chapter has examined household differentiation in settlement location through time, as well as how household size may have been affected by soil quality. Diachronic settlement patterns suggest that during early occupation periods in the Naco Valley, there was a trend towards occupying fertile land near water sources. During very early occupation periods, households avoided lower quality agricultural soil, concentrating on both good and very good soils (Class I, including pockets of prime fertility). During the Early Classic, there is the first evidence of occupation on poorer soils, with single households occupying these areas (Classes II and III soils). During the Late Classic period, this trend was reversed, with significantly more occupation on

the poorest soil class than would have been expected if settlement was evenly distributed across soil zones. If household location during the Late Classic had been negatively affected by poor soil fertility, one would anticipate fewer observed occupations on Class III land than the expected numbers, rather than more. Therefore, by the Late Classic, household location was not as influenced by soil fertility as it had been during earlier periods.

The relationship between variation in the household developmental cycle and soil quality was also examined. It was hypothesized that rural households located on better agricultural lands would be larger than rural households settled on poorer agricultural soils. In effect, agrarian rural households on poorer soils may fission more readily than those on better soils because household members would not care to inherit poor quality agricultural land. Analysis of rural Late Classic household settlement patterns suggest that any differences observed between the trimmed mean size of rural households are not very significant.

Therefore, it appears that soil quality has had a variable affect on households through time. During early periods of occupation in the valley, when settlement density was low, households favored fertile agricultural soils over poor ones. However, by the Late Classic, both household location and household size appear to have not been as affected by soil quality. In future chapters, I will examine

how soils may have affected other household variables, such as production and wealth.

Table 2.1 Late Classic Settlement Typology, Naco Valley, Honduras

Tier 1:	La Sierra settlement area, 486 visible structures of variable size and height surrounding a monumental site core.
Tier 2:	Sites with 41–44 visible structures, including monumental architecture which define formal plaza groups.
Tier 3:	Sites with 16–26 visible structures, including monumental architecture which define formal plaza groups.
Tier 4:	Sites with 12–18 structures, which include limited monumental architecture and have no formal plazas.
Tier 5:	Sites with no more than a single monumental construction, usually lacking large-scale construction.

Table 2.2 Soil Classifications for Surveyed Areas in the Naco Valley, Honduras

Soil Class	Soil Characterization	Soil Order	Soil Great Groups
I	Very good fertility	Mollisols	Arguidoll, Calcic Arguidoll Haplustoll, Typic Hapludoll Hapludoll, Hapludoll/Arguidoll
II	Moderate fertility	Entisols	Mollic Udifluvent
III	Poor fertility	Oxisols	Eutrudox

(Sources: Anderson 1994; Soil Survey Staff 1975)

Table 2.3 Middle Formative Settlement Patterns on Classified Soils in the Naco Valley

Soil Class	# of households	% of households	# of structures	% of structures	Soil Area Surveyed km^2	% of total	Density of structure/km^2
Class I	8	100.0	10	100.0	68.4	84.5	0.15
Class II	0	0	0	0	7.8	9.6	0.00
Class III	0	0	0	0	4.8	5.9	0.00
Total	8	100.0	10	100.0	81.0	100.0	0.12 (mean)

Table 2.4 Late Formative Settlement Patterns on Classified Soils in the Naco Valley

Soil Class	# of households	% of households	# of structures	% of structures	Soil Area Surveyed km^2	% of total	Density of structure/km^2
Class I	2	100.0	5	100.0	68.4	84.5	0.07
Class II	0	0	0	0	7.8	9.6	0.00
Class III	0	0	0	0	4.8	5.9	0.00
Total	2	100.0	5	100.0	81.0	100.0	0.06 (mean)

Table 2.5 Early Classic Settlement Patterns on Classified Soils in the Naco Valley

Soil Class	# of households	% of households	# of structures	% of structures	Soil Area Surveyed km^2	% of total	Density of structure/km^2
Class I	19	90.5	93	93.0	68.4	84.5	1.36
Class II	1	4.8	4	4.0	7.8	9.6	0.50
Class III	1	4.8	3	3.0	4.8	5.9	0.60
Total	21	100.1	100	100.0	81.0	100.0	1.23 (mean)

Table 2.6 Late Classic Settlement Patterns on Classified Soils in the Naco Valley

Soil Class	# of households	% of households	# of structures	% of structures	Soil Area Surveyed km^2	% of total	Density of structure/km^2
Class I	106	80.9	766	82.5	66.7	84.1	11.48
Class II	7	5.3	56	6.0	7.8	9.8	7.18
Class III	18	13.7	106	11.4	4.8	6.0	22.08
Total	131	100.0	928	99.9	79.3	99.9	11.70 (mean)

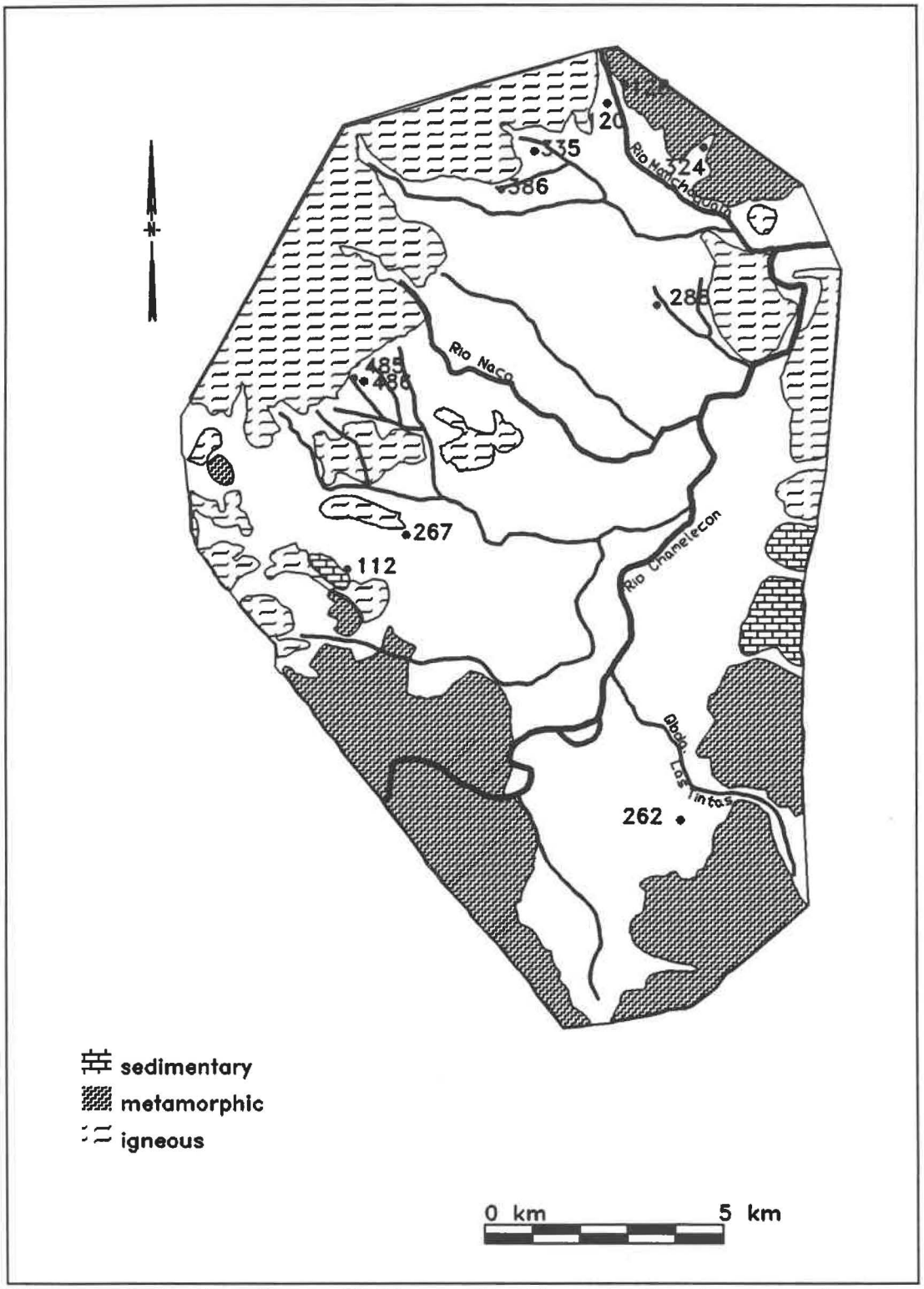


Figure 2.1 The Naco Valley, Northwest Honduras, showing Late Classic households discussed in subsequent dissertation chapters.

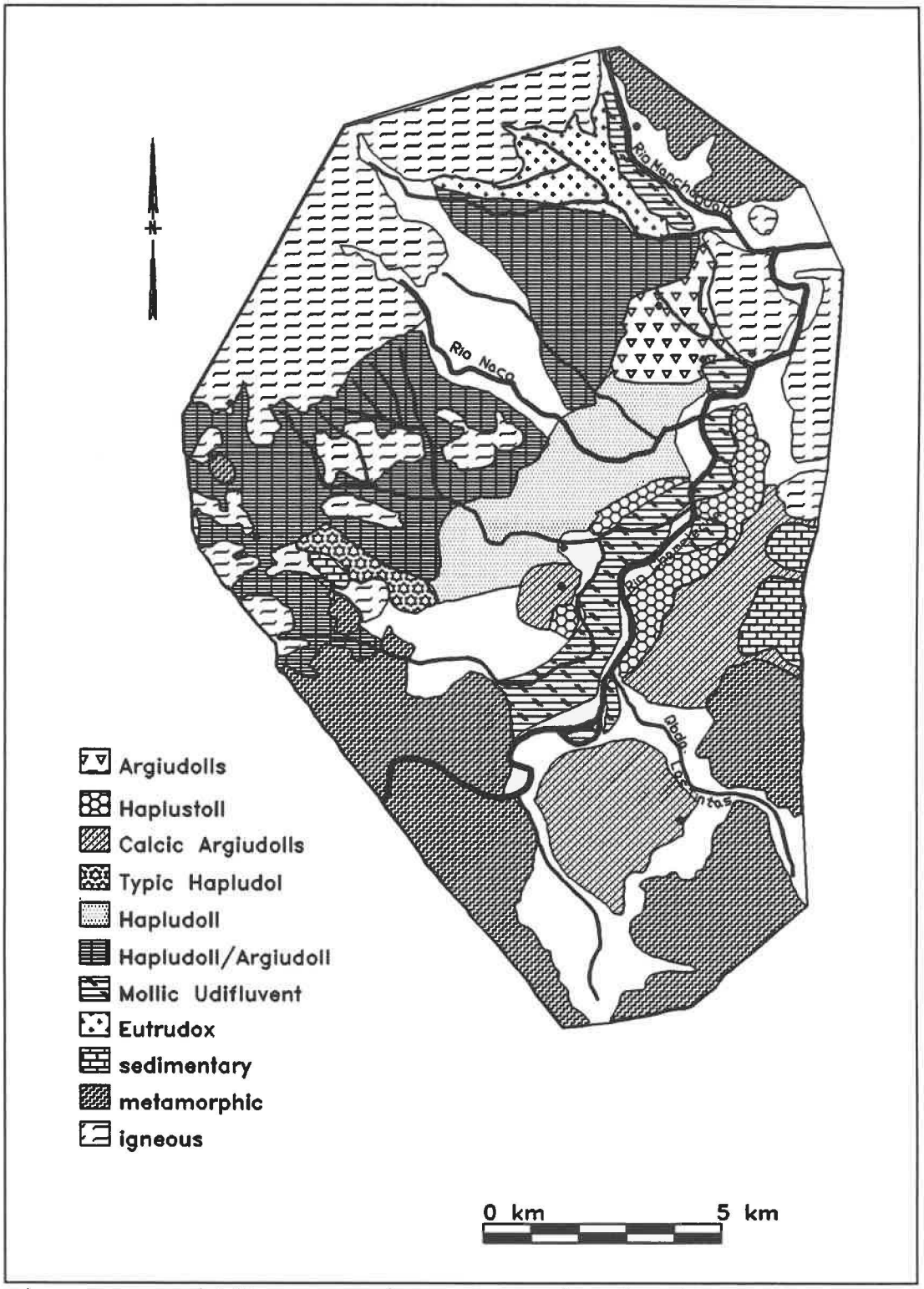


Figure 2.2 Middle Formative Occupation in the Naco Valley.

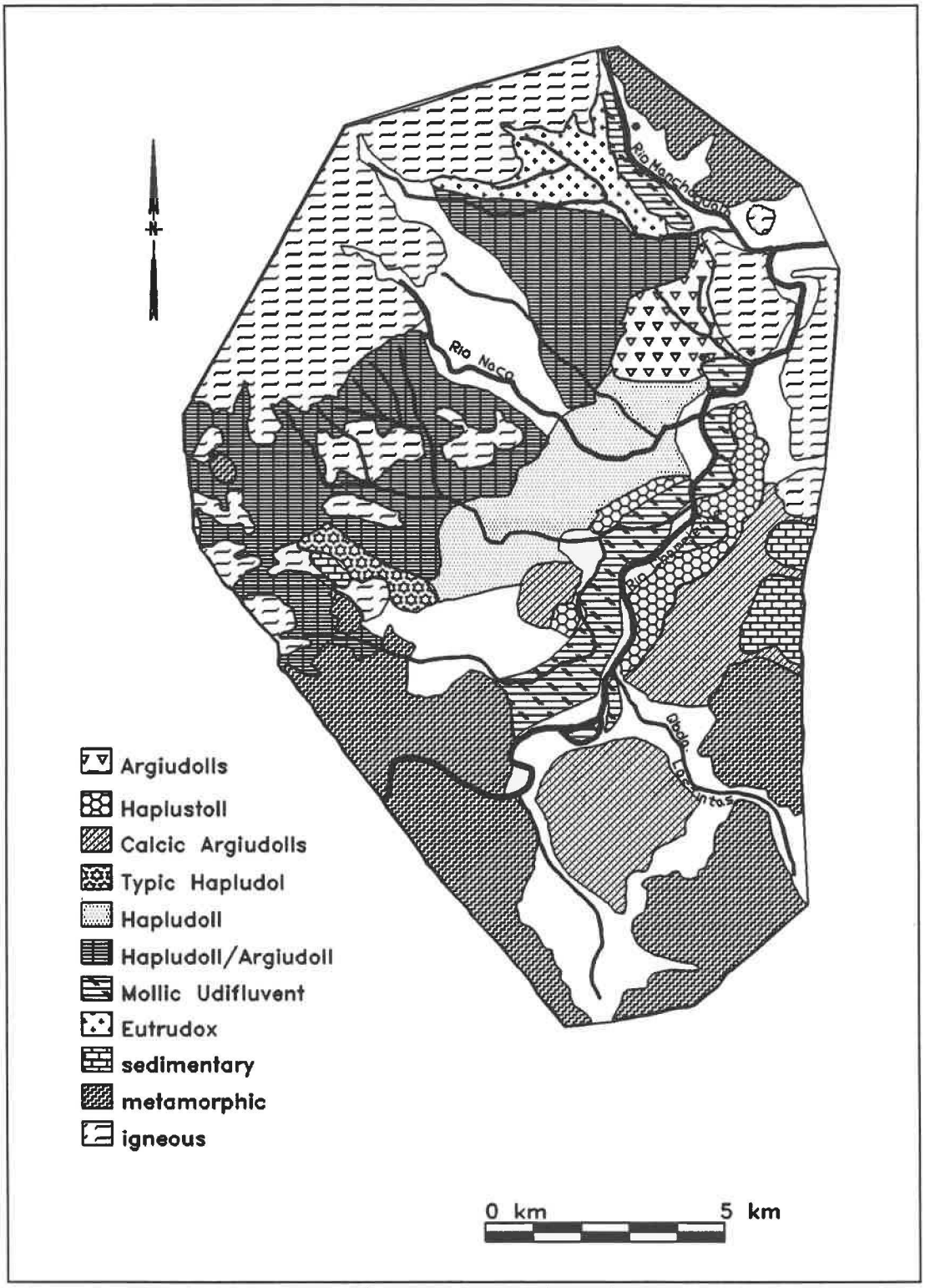


Figure 2.3 Late Formative Occupation in the Naco Valley.

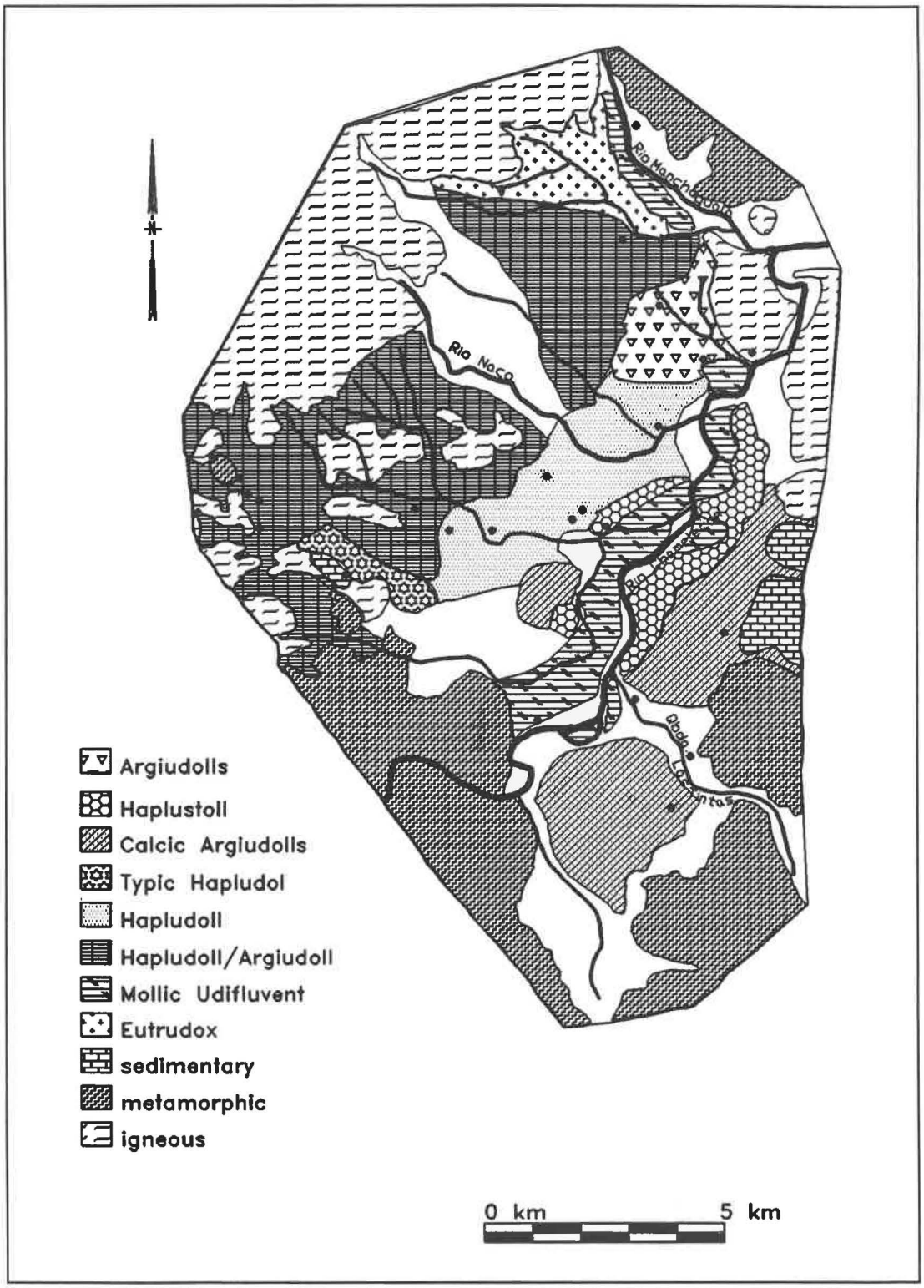


Figure 2.4 Early Classic Occupation in the Naco Valley.

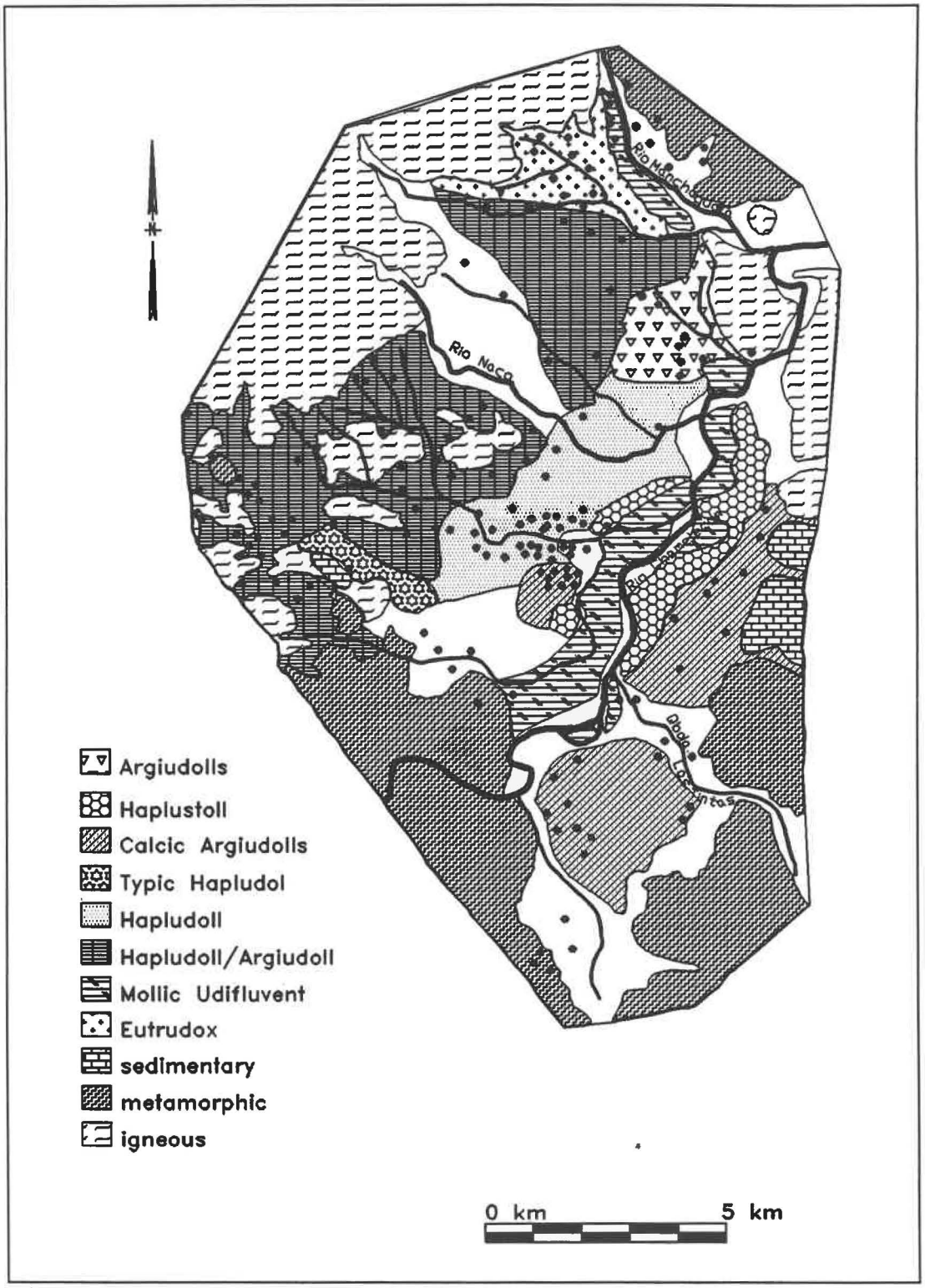


Figure 2.5 Late Classic Occupation in the Naco Valley.

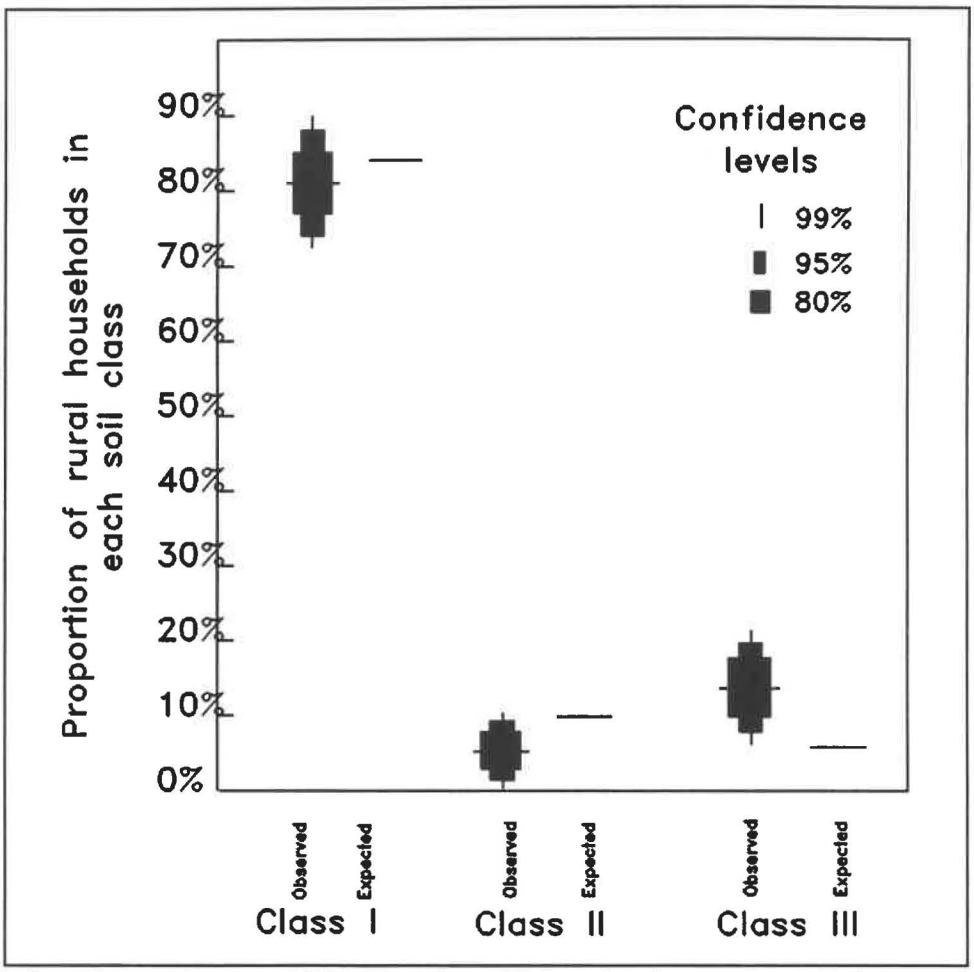


Figure 2.6 Confidence levels of the proportion of observed and expected Late Classic rural households on each soil class.

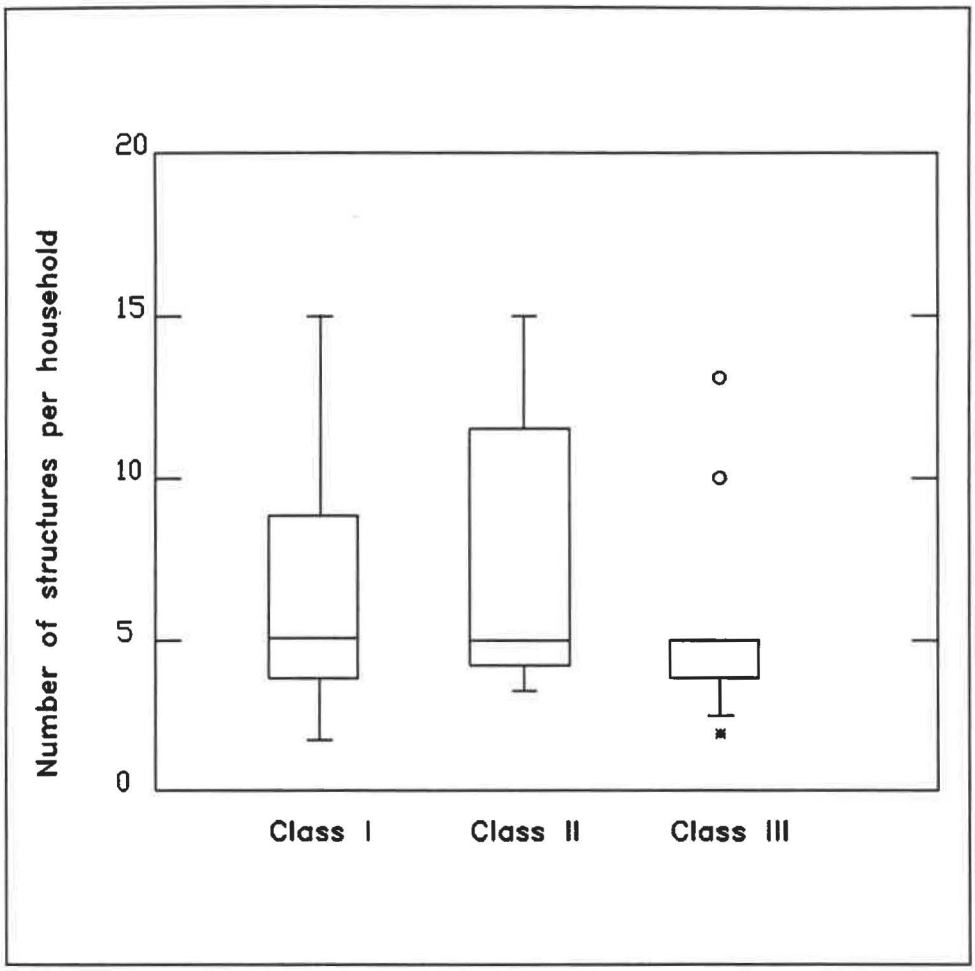


Figure 2.7 Box-and-dot plots of 10% trimmed number of structures per Late Classic rural household on each soil class.

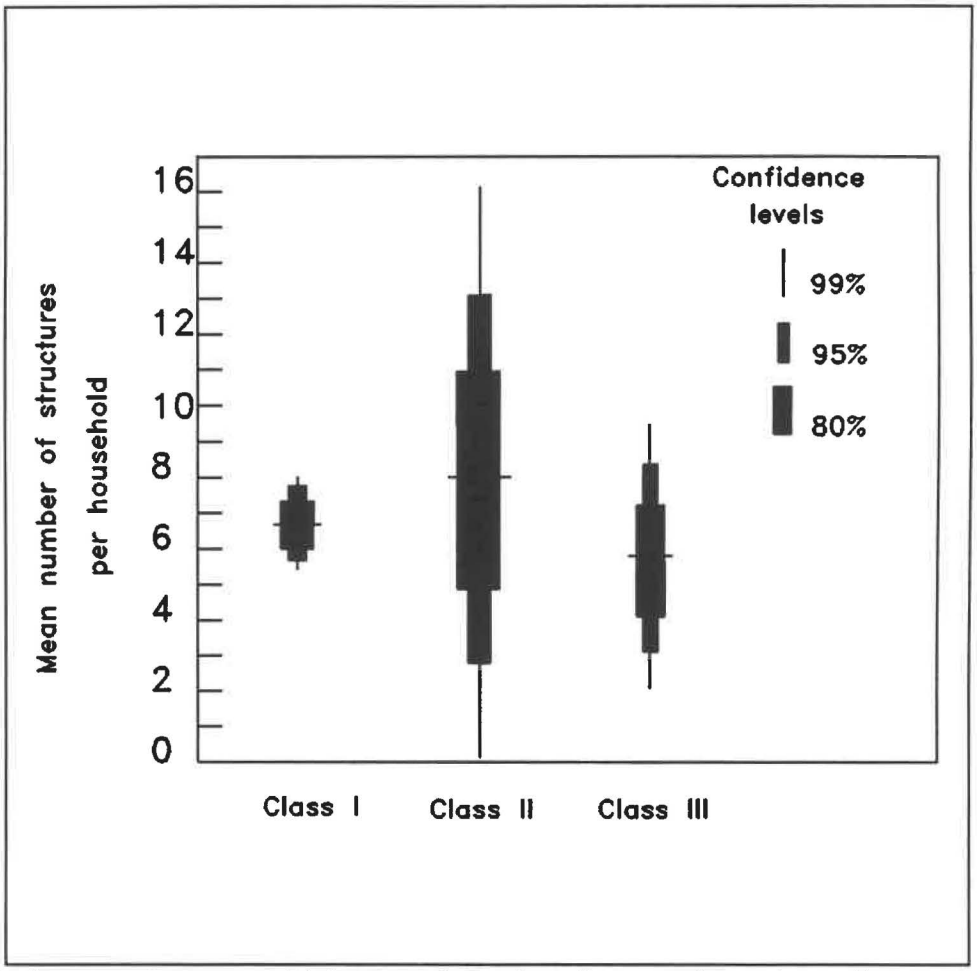


Figure 2.8 Confidence levels for 10% trimmed mean number of structures per Late Classic rural household on each soil class.

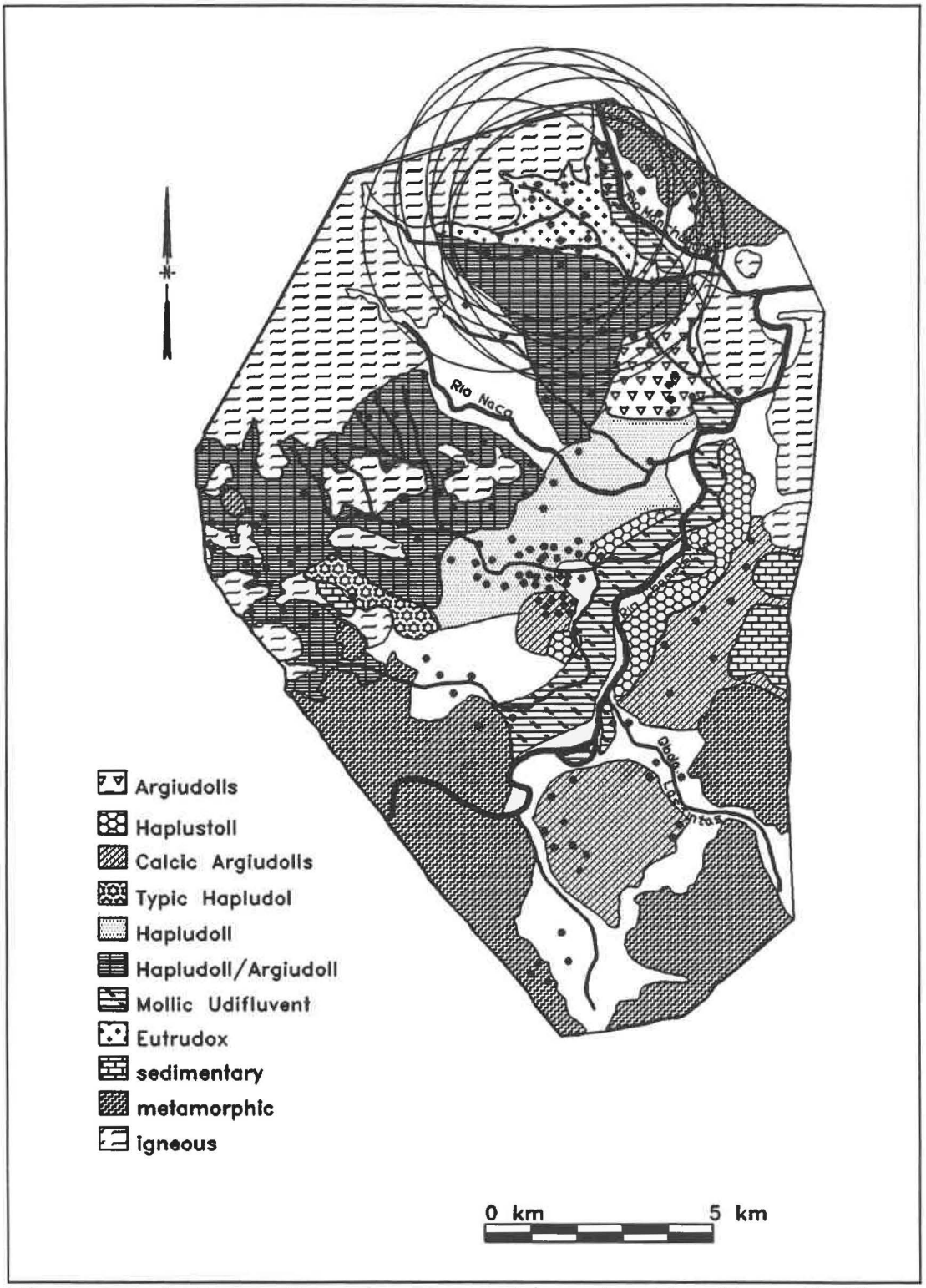


Figure 2.9 Late Classic occupation in the Naco Valley, showing hypothesized 3 km catchment zones for rural households on Class III soils.

CHAPTER THREE

CONCEPTUALIZING AND DOCUMENTING HOUSEHOLD ARCHITECTURE, ACTIVITIES AND WEALTH IN THE LATE CLASSIC NACO VALLEY

Introduction

As discussed in Chapter One, small and large households are documented both archaeologically and ethnographically to have differences in composition, wealth and production potential. In the current chapter, I outline the methodological and theoretical background for these potential departures. Chapters Four and Five then discuss the archaeological remains of Late Classic small and large households in the Naco Valley, respectively.

Methodology

Households chosen for investigation that provided a range of both sizes and locations across the various soil classes in the valley. At least one household from each soil order was investigated. On Class I and III soils, examples of both large and small households were examined from the same soil order. After reviewing excavations in the Naco Valley prior to 1996, the author excavated four households during the 1996 season to round out the sample, making sure all soils or portions of the valley were represented. Class II soil is represented by a single large household, rather than both a small and large household, due to its relatively small area and small sample size. One small household in the study, Site 324, is not

located on a classified soil. However, Kirk Anderson (personal communication 1997) indicates that the area around the household is generally similar in fertility to Class I soils.

Field investigations of households commenced with clearing vegetation covering mounds and adjacent areas, ensuring that all structures and other features were visible. Subsequently, surface artifacts were collected. Structures picked for excavation were chosen to represent the full range of observed diversity in structure size, shape, or other visible variation.

Initial examination of structures was undertaken via an axial trench across the center of an edifice. After trench wall profiles were drawn, structures were stripped of overburden, exposing architectural features. At times, only a portion of the entire structure was excavated, primarily due to time constraints. In these cases, a sufficient portion of the structure was excavated to allow comparative studies of architecture and artifacts. Information on the extent of excavations is reported in the discussion of each individual structure.

All household excavation lots collected by the author during the 1996 season were screened using 0.25" screen. However, excavations undertaken by other members (including the author) in previous years did not include screening of material excavated. Clearly, this difference in collection methodology may affect comparisons of activities associated with structures, and consequently, households. Smaller

artifacts may not have been recovered by earlier excavations, while they are included in data collected most recently by the author. However, the methodology of targeting rural households remains otherwise similar. Extensive clearing of architecture and intensive collection of artifacts minimizes the possibility that there are systematic differences in the collections beyond screening methods. Therefore, while lost data remains a possibility in excavations not screened, the comparison of screened and non-screened data is reasonable.

Artifacts collected during the excavation of household structures were uncovered in several different contexts, including overburden and fill. Artifacts used in this dissertation are those associated with the final (terminal) occupation of the edifice, including abandonment. These artifacts fall into two broad categories of archaeological (as opposed to systemic) formation processes: abandonment and de facto refuse (Schiffer 1972, 1976, 1983, 1985; see also Deal 1985; Wilson 1994). During the final period of occupation of a structure, inhabitants may be less willing to keep a structure clean than they may be otherwise. As a result, more artifacts accumulate in or near a structure than is normally the case. These artifacts are referred to as abandonment refuse. When the edifice is finally abandoned, certain goods may be left behind, some of which may be in still-useable condition. These goods are referred to as de facto refuse. Certainly, some household items will be taken with the household to a new location, but items not taken might be left

behind, given to neighbors or scavenged after abandonment. De facto refuse will generally not be recovered where it was used. If found on a floor, there is the possibility that it will be misinterpreted as an activity area, rather than de facto refuse (see Deal 1985). Excavations of structures in the Late Classic Naco Valley rarely were able to define floors or activity areas. A major contributing factor to this problem is a lack of clear stratigraphy in Naco Valley soils. For example, as discussed in Chapter Two, Oxisols rarely have clearly marked soil horizons. Many structures in the valley contain earthen floors constructed of material similar to that used to construct the walls. As structures are abandoned and walls collapse and melt, this obscures the definition of the floor, given the similar color and texture of the surrounding soil (see Deal 1985).

All artifact assemblages used in this dissertation, unless otherwise noted, are a mixture of abandonment and de facto refuse, dating from the final occupation and termination of a structure, and are normally found in the naturally laid overburden enveloping a building. As a result, artifact counts are taken for structures as a whole, rather than for various specific locations in or outside buildings. There is scant evidence of heavy post-abandonment secondary refuse in structures; that is, trash disposal in an abandoned edifice by neighbors. Some abandoned structures may become attractive disposal sites for refuse. In essence, rubbish attracts rubbish (see Wilk and Schiffer's [1979] discussion of the

"Arlo Guthrie trash-magnet effect"). If artifactual patterns suggest post-abandonment secondary refuse deposits, this is noted in the discussion of the affected structures. These two secondary contexts, uncovered in the overburden of structures, are used in this dissertation due to the dearth of midden contexts uncovered during excavations.

Prehistoric Household Structures in the Naco Valley

Chapter Two presented analysis of household size by investigating the number of structures and groups of structures present at a given locale, based on settlement pattern data. These prehistoric structures appear as a gentle mound of earth, sometimes covered with trees or other vegetation. A variety of stones, sherds, lithics and other artifacts may litter the surface of the mound. As well, in the Naco Valley most mounds contain multiple intrusions, created by contemporary Naqueños excavating these prehistoric structures in search of long-lost artifacts or building materials for modern houses. Indeed, these prehistoric mounds are a dependable, almost never-ending, sources of river cobbles.

Recent investigations in the Naco Valley and elsewhere suggest that traditional housing construction techniques in Mesoamerica are similar to those utilized during antiquity. Late Classic dwellings in the Naco Valley are normally built on a sub-structure platform with a river cobble or limestone cut-block face filled internally with earth and stone. Recent

research in Copán, Honduras suggests that all structures were elevated off the natural grade in this fashion (Webster and Gonlin 1988). In other areas of Mesoamerica, however, while the majority of structures were constructed on platforms, some were built at ground surface (Pyburn 1989, 1990). These low-lying structures are virtually invisible without excavation. While a number are known from Late Classic Naco, ground surface dwellings are much rarer than platforms during this period and increased substantially in popularity during the Postclassic, when there is a dearth of mounded architecture.

After the platform foundation is constructed, superstructure walls of wattle and daub (bajareque) are erected. These outer walls are fashioned of interwoven branches and sticks plastered with mud and set on stone foundations. Interior walls, segmenting internal space, may be constructed on narrow, single lines of stone, forming much less substantial walls than exterior ones. Similar construction techniques have been documented at Cerén (Sheets 1992, Sheets et al. 1990) and at Copán (Webster and Gonlin 1988, Webster, Gonlin and Sheets 1997). However, Late Classic Naco Valley bajareque exterior walls are constructed slightly differently, with stones filling gaps in the stick framework before the application of mud plaster. This results in more substantial walls than can be constructed with simply mud plaster, as well as significantly more tumble to be excavated by the archaeologist after the house has been abandoned.

In southeast Mesoamerica, three distinct types of structures associated with households have been observed (Gonlin 1993, 1994; Hendon 1991; Sheets 1992; Webster and Gonlin 1988; Webster, Gonlin and Sheets 1997): residential, ancillary and non-household, or supra-household, structures. Residential structures, while often multi-functional in nature, serve primarily as the dwelling of members of a family or household. Architectural features consistent with residential structures include benches, shelves and niches. Benches have been shown to be used for sitting and sleeping (Adams 1970). Benches and shelves in the Naco Valley are typically constructed of vertical faces of stone backed with earthen fill. Paved surfaces are normally constructed of earth or stone. Overall dimensions distinguish a bench from a shelf; benches are long and narrow, while shelves are wide and short. Evidence from Cerén suggests that at least some residences contained perishable furniture, including benches and shelves (Webster, Gonlin and Sheets 1997:54). If this is true, it could be difficult to identify some residential structures by surviving architectural features alone.

In household groups, one structure may be larger and more elaborate than the others. There are diverse views as to how these structures functioned. Some, such as Leventhal (1983) or McAnany (1994) view these as ritual or ancestral worship structures. Typically, a centrally located structure in a patio group may function as a household crypt of sorts, containing ancestors of the current household. Over several

generations, household members may be interred within this structure. However, in many areas of Mesoamerica, household members were buried under the house floor of other structures. However, the scant number of burials recovered in the Late Classic Naco Valley suggests that interments were placed away from the house.

Other authors, such as Tourtellot (1988) and Haviland (1988), argue that these large, central structures, dubbed the founder's dwelling (see Tourtellot 1988), may be the earliest (or one of the earliest) edifices built at a household settlement. Their large sizes, therefore, result from growth by accretion. The size or height of a structure can be a partial result of the life cycle of that building, with one version of a structure around or enveloping another, earlier one (Deal 1985:267). These structures can partially function as ancestral shrines, but they serve primarily as domestic residences. Unequal access to labor may also explain why houses associated with founding families are larger and better built than neighboring structures in a settlement. Hendon (1991:906-907) has argued that large, central structures in household groups, which she refers to as dominant structures, function primarily as domestic residences. She views the greater size and better quality of construction of dominant structures as the result of a higher social rank (status) for their occupants compared to other household members.

While these different theories will be evaluated when possible in Chapters Four and Five, I argue generally that the

developmental cycle of households, specifically related to founder members, can potentially have a great effect on the wealth of founder members and their descendants. Tourtellot (1988) has shown that dominant residences in Late Classic Seibal are indeed larger and older than other structures in patio groups. Founders can prevent other household members from constructing similarly-sized dwellings in an attempt to build stronger social bonds between members (see Wilk 1983:109-111). Tourtellot (1988:108) argues that founders tend to be wealthier and have obtained higher social status than other household members because they control, and have access to, more labor and economic power than other households.

Ancillary structures form a second class of edifice observed in the Late Classic Naco Valley and are typically defined by a lack of permanent furniture, primarily benches. Ancillary structures in Copán appear to be less-well built and smaller in size than residential structures (Hendon 1991:901; see also Schortman and Urban 1995 for a discussion of architectural criteria for the Ulua drainage, Honduras). A wide variety of activities occur in ancillary structures, including food preparation, food consumption, storage, ritual activity and craft production (see Schortman and Urban 1995; Webster, Gonlin and Sheets 1997:50). Field houses are one type of ancillary structure.

Supra-household structures comprise a final class of buildings outside rural households in the Late Classic Naco Valley. These types of structures include ancestral lineage

shrines, ritual loci, or, in an example from Cerén, a sweat house (Sheets 1992). Architectural features and artifact distributions will vary with the specific function of such special structures.

Energetic studies of Maya architecture are becoming increasingly popular (Abrams 1989, 1994; Arnold and Ford 1980; Ford 1991; Gonlin 1993; Ringle and Andrews V 1988). Certainly, studies that quantify the labor needed to build certain structures or architectural styles are important to determining the degree of status or power a structure's inhabitants may possess. This calculation includes not only the construction of an edifice itself, but also the collection, transportation and final forming of materials used in the building. In this way, Abrams (1989:73) has estimated that a basic commoner residence in the Copan Valley could be built by two to five people with no specialized skills in several weeks. There are differences in the sizes and volume of commoner residences, but the construction materials are very similar. Late Classic Naco Valley rural household dwellings are fairly homogeneous. Unlike other areas of Southeast Mesoamerica, like Copán, where some rural sites may contain cut-block architecture or other labor-intensive materials, dwelling foundation and sub-structure platforms in the Late Classic Naco Valley are constructed primarily of river cobbles or other unaltered stone, while superstructures are fashioned of bajareque and (presumably) thatch. Ancient mud brick preserved in a river cut suggests that some

structures were also constructed of other building materials, such as adobe. However, this has not been documented in an archaeological context outside a Middle Formative building in northern Naco. Unlike Copán, where platforms and superstructures were routinely plastered with sascab (decomposed limestone) (see Abrams 1994:68-74), dwelling remains in the Late Classic Naco Valley indicate that the vast majority were plastered, if at all, simply with mud. House size will be measured and evaluated for differences in perceived household wealth, based upon the assumption that house size will be a factor of the owner's access to labor. However, all households in this study are estimated to be in the lowest rank of labor requirements, a balanced form of reciprocity in the household (see Abrams 1994:110-119).

Degree of Wealth Among Prehistoric Households

Until fairly recently, it was assumed that rural, agrarian households were uniform in nature, with little or no differences in wealth, production or consumption. However, recent research has forced archaeologists to view rural households as much more complex units. Quantifying the relative wealth of a household is an important step in this process because it allows rural households to be better understood in relation to social complexity (e.g. Fried 1967). If there are differential patterns of wealth among rural households, what is the basis of this variance?

Wealth has been defined a number of different ways in archaeological and social theory. Because wealth is culture specific, it is difficult to characterize and quantify. Certainly, a number of different variables, rather than a single one, ought to be examined to estimate wealth. For my purposes, wealth is viewed as the accumulation of material goods or services of value.

Smith (1987) argues that three fundamental types of archaeological data are useful for determining household wealth: residential architecture, burials, and household artifacts. Residential architecture is perhaps, according the Smith, the strongest indicator of the relative wealth of an agrarian household (see also Rathje and McGuire 1982 for a similar view). While there are a number of other potential outlets for expressing household wealth, architecture is useful, in part, because it is a permanent and functional symbol that cannot be subject to the enigmas of gift, loan or disposal (Tourtellot, Sabloff and Carmean 1992:81). House size is determined by the degree of household access to restricted goods and services, in this case labor. As Price (1978:169) has pointed out, "Differential housing...represents...the differential ability of individuals or co-resident groups to dip into the total energy flow and direct some of it for private use..."

Residential architecture encompasses variables of both house and household size. These values can be measured by the number and/or dimensions of houses. Wealthier households may

have more room space or more elaborate permanent furniture, such as benches, than their poorer contemporaries (e.g. Kramer 1979; Hayden and Cannon 1983; Wilk 1983; McGuire and Schiffer 1983; Lee and Hayden 1988). These residential variables are all related in a systemic sense to the assumption that wealthier households will have greater control of, and access to, labor, resources and functions (see Hirth 1993:123). The greater the control a household has over resources, the more likely it will incorporate non-kin members into their domestic unit. Therefore, household size will be examined in the current study to evaluate its connection to other indices of wealth.

Burials have been determined by Smith (1987) to be very useful in measuring household wealth and status. Unfortunately, sufficient burial information is not available for the current study. Only a few burials were encountered during excavations. Of these burials, the majority were secondary interments, which would not allow sufficient information on the original burial practices to study the relative wealth of individuals.

Lastly, household artifacts are viewed as a strong indicator of household wealth (Smith 1987). Serving vessels are one such indicator. First, wealthier households possess a greater proportion of serving vessels, compared to poorer households. Larger households undertake household rituals that include large social gatherings of non-household members. Clark and Blake (1994) have argued that individuals in

emerging complex societies may compete for loyal supporters and prestige through competitive generosity in the context of such rituals. These aggrandizers compete for prestige through offering resources to non-kin with the cooperation and support of indebted clients and lineage members. By offering resources to non-kin, these aggrandizers can draw on this fund of inter-relationships created by generosity for labor. While this model is based on Formative Period Chiapas, the underlying principle of wealthy individuals offering generous feasts in return for labor is testable for other households across time and space. If wealthier households do undertake feasting rituals for non-household members, a larger proportion of serving vessels ought to be found than in poorer households.

Furthermore, wealthier households may also have a higher proportion of valuable ceramic wares relative to total ceramic wares than less wealthy households. While the concept of "valuable" is a relative one, here it is used in connection with energy cost. Specifically, ceramics that are imported from other areas or are elaborately decorated local varieties will have higher energy costs associated with them. Imported wares, for example, will have a higher cost associated with transportation. Imported wares may also symbolically reflect ties with distant areas, or access to long-distance networks.

For this category of wealth indicator, a number of locally-produced elaborately decorated and imported ceramic wares have been identified for the Late Classic Naco Valley. These valuable ceramic wares are: Alsacia, Capulín, Cebadilla,

Chalja, Chamelecón, Coyolito, Coyolón, Cuscuso, El Negro, Guiral, La Zorra, Los Culucos, Los Culucos Group, Los Culucos: S, Los Ladrillos, Nicanor, Petoa, Reina, Sulaco, Tipón, Tipón with red, Ulua I and Ulua II (for a complete description of these and other ceramic types, see Urban 1986, 1993).

Ritual activity may also have an influence on wealth accumulation. Smith (1987) observes that wealthier households participate more heavily in public ritual activity, while poorer households devote their energies to private rituals. This does not mean, however, that wealthier households will not engage in private ritual; on the contrary, there is ample evidence in the Naco Valley and elsewhere that private ritual was common among all households. In the Late Classic Naco Valley, urban and rural household ritual activity, as evidenced by remains of censers, appears to be primarily private in nature. While there is still ambiguity as to the function of figurines, this omnipresent artifact type has been hypothesized to be related to private ritual activity (see Charlton 1994; Widmer and Storey 1993:92). Evidence of intentional figurine destruction at household locations in the Tlajinga Barrio at Teotihuacán indicates that they may have functioned as household deities. Hendon (1991:909) has noted for Copán that, while there was little emphasis on manufacturing figurines, there was strong household interest in both possessing and using (consuming) figurines. Public ritual, as evidenced archaeologically through the presence of paper, stingray spines, spondylus shell, and so forth, is

primarily found within the core of La Sierra. Therefore, it is hypothesized that wealthier households will show less evidence of private ritual activity, as seen through censer and figurine fragments, than poorer households.

It is important to remember that the concepts of wealth and elites are relative. It has been pointed out that archaeologists, whether consciously or unconsciously, are drawn to flashy, flamboyant elites and wealthy individuals, ignoring the drab majority in the process (see Rathje and McGuire 1982:707). In urban settings, it is relatively easy to identify primary elites and other wealthy households and individuals (such as titled nobles) by their material possessions and dress, their residences, and their access to esoteric knowledge and exotic goods. Even in relatively "urban" settings, such as the Classic Period Copán Valley, there are easily identifiable nobles, as evidenced by the secondary elite (Webster 1992) compound of 9N-8 (e.g. Hendon 1991; Webster 1989). This compound contains ample evidence of: elevated access to labor to produce elaborate cut-block structures; attached specialists fashioning craft goods; access to exotic goods and esoteric knowledge; and polygyny and dependent families in the household. Comparison of the 9N-8 compound to other areas of the Copán Valley illustrates persuasively what is meant by urban elites.

In a smaller-scale polity, like that found in the Late Classic Naco Valley, the differences between urban and rural, elite and non-elite, are much fuzzier (e.g. Henderson 1992).

While this in a sense may be more frustrating, it is important for archaeologists to view wealth as a continuum between high and low, rather than simply wealthy or poor (e.g. Chase 1992; Clark 1995:280-281). Certainly in the urban core of Late Classic La Sierra, there is cut-block architecture, and evidence of an urban elite who was able to harness labor for state-supported projects. However, once outside the urban core of La Sierra, the homogeneity of architecture is much more pronounced. In the Classic Period Copán Valley, there are rural elite settlements, with cut-block architecture and other diagnostic elite fashions. In the Late Classic Naco Valley, architectural elements outside the diminutive urban core of La Sierra consist almost entirely of cobble faced, earthen-filled platforms. While some households may use laja (schist) in their constructions for display, this is arguably more a function of distance to an easily exploited schist deposit than access to a labor-intensive construction material with limited availability (such as cut-limestone or volcanic tuff block).

Therefore, while there certainly are differences in the status and wealth of households in the rural, Late Classic Naco Valley, these differences are much less apparent on the surface than in other areas of the southeast periphery, such as Copán. Certainly, there is much more open and confused discussion these days about what goes into a definition of elite or wealthy individuals than there has been in the past (e.g. Chase and Chase, eds. 1992). It is now realized, for

example, that simply stating that elites or wealthy individuals reside in urban cores and poor peasants occupy peripheries does not acknowledge the full range of variation in the Maya lowlands and peripheries (e.g. Chase and Chase 1992:10)

Rural Household Craft Production: Organization and Tempo

Specialized production has been seen as an important hallmark of complex societies for centuries. In modern times, perhaps Adam Smith was one of the first to propose a modern theory of labor specialization and surplus. Childe (1950) argued that specialized production was vital to complex social organization, possibly due to the increased interdependency, and thus increased efficiency, of production.

At a more fundamental level, Wilk and Rathje (1984) argue that a central function of households is production. Certainly, there are differences in the kind, degree and intensity of production, ranging from generalized, non-specialized domestic production (Sahlins 1972) to highly specialized craft production (Arnold III, Pool, Kneebone and Santley 1993; Brumfiel and Earle 1987; Costin 1991; Evans 1978; Lewis 1996). One positive and immediate effect of Evans' (1978) study of early Chalcolithic craft specialization was to spur archaeologists to be more specific when discussing specialized production. While specialization may be defined in numerous ways, I use Costin's (1986:328, quoted in 1991:3) definition of, "the regular, repeated provision of some

commodity or service in exchange for some other." This implies that specialists are members of an economy where members do not consume all they produce, nor do they produce all they consume. Therefore, Costin (1991:4) argues that, "specialization is a differentiated, regularized, permanent and perhaps institutionalized production system in which producers depend on extra-household exchange relationships at least in part for their livelihood, and consumers depend on them for acquisition of goods they do not produce themselves." Clark and Parry (1990:298) second this view, contending that craft specialization always involves the transfer of goods from producer to non-dependent consumers.

Craft specialization can be divided into two inter-related, yet separate, definitive processes: the organization and the intensity of specialization (Brumfiel and Earle 1987; Costin 1991; Earle 1981; Lewis 1996; Santley and Kneebone 1993; Sinopoli 1988). Brumfiel and Earle (1987; Earle 1981) have argued that the organization of craft specialization is divided into two categories: independent and attached specialization. In essence, independent specialization is a function of economic necessity. That is, independent specialists will produce a quantity and type of goods for consumers based upon the demands of exchange networks or markets (Brumfiel and Earle 1987). It has further been hypothesized that the intensity of production (see below) is related to the amount and quality of materials available to consumers (Lewis 1996:368).

Attached specialization functions differently from independent specialization in that elites create a demand for specialized products, rather than trade networks or markets (Brumfiel and Earle 1987; Earle 1981). Therefore, the demand for goods is politically, rather than strictly economically, based. Originally, attached specialization was conceived of as nucleated, elite-sponsored or coerced production in a restricted area (Brumfiel and Earle 1987). However, more recently, attached specialization has been enlarged to encompass a variety of elite-sponsored activities. These include dispersed corvee labor (Costin 1991) and tribute production (Clark and Parry 1990), in which goods are produced at the household level for elite use. Because attached craft specialization is believed to be for the use of elites, it is generally evidenced in the archaeological record by the production of goods of high technical quality or restricted forms. Lewis (1996:376-8) follows this logic, arguing that attached specialization may be identified based on the nature of the good. While he acknowledges that critiques of this approach center on the need to view specialization as an economic, rather than an artistic, phenomenon, he sees the need to include all avenues of research.

Alternatively, the key to attached specialization, argues Costin (1991:7), is elite sponsorship of, "the productive process in order to control the distribution and consumption of high-value, high-status goods." Arnold and Munns (1994) have argued for the redefinition of attached specialization

based upon their study of bead manufacture in the Channel Islands of California. Non-centralized, attached production may create tribute goods of relatively low status, such as common household goods removed from a centralized location. In this way, independent specialists have greater direct contact with the ultimate consumer with little or no dependence on elites. However, it is difficult in the archaeological record to distinguish at this level between whether these goods are produced for tribute, for elite demand and consumption, or for a market economy. In contrast, independent specialists produce goods over which they maintain control of the distribution (Arnold and Munns 1994; Clark and Parry 1990).

The concentration, scale and intensity of production are similarly important to identify in the archaeological record (Costin 1991:9-18). Studies of the concentration of production in a polity, region or other bounded area focus primarily on how producers are located on the landscape. The concentration of specialists may be viewed as a continuum, from situations where producers are tightly nucleated in one central location, to producers evenly distributed across the landscape. Costin (1991) argues that the concentration of labor may vary with the distribution of resources related to production and the costs involved with transporting raw materials and finished goods. If resources related to production are concentrated, producers may have more reason to nucleate than if resources are evenly distributed across the terrain. Furthermore, if specialists produce small, easily transported goods, they may

be more willing to produce their items some distance from consumers than would producers of large, less easily transportable goods.

The scale of production is also a continuum, from small, informal, kin- or household-based production to large, formal, non-dependent workshops or factories (Costin 1991). Here, size is an important variable. That is, how many individuals are producing goods at a single location or in a single household? The intensity of production is specifically related to the scale of production and mirrors the amount of time specialists invest in producing goods. Production activities may be undertaken on an ad hoc (sporadic), part-time or full-time basis (Clark and Parry 1990:298-299). It has been suggested that, among many agrarian societies, farmers will undertake independent craft specialization during down-times of the year (Costin 1991:17; D. Arnold 1985; P. Arnold 1991; Wilk and Rathje 1982). Farmers may be risk-minimizers who do not undertake full-time craft specialization without sufficient motive.

In the context of the rural Late Classic Naco Valley, three specific types of specialization are related to the scale and intensity of production: household production, household industry and workshop industry (see Arnold 1991; Charlton, Charlton and Nichols 1994; Costin 1991; Rice 1987; Santley and Kneebone 1994; Stark 1995; Van der Leeuw 1976). Household production is normally defined as ad-hoc or part-time craft production, where kin-related household members

produce a wide ranges of goods in limited amounts (Costin 1991:30-31). Production output is relatively low because households are producing for their own use. Because simple household production creates goods for kin-members only, this is not considered specialization.

Household industry is more intensive, part-time craft specialization, where household members produce a similar range of products, but more intensely. Here, household members will produce goods for non-household consumers. Therefore, household industry is specialization.

Finally, a household workshop industry produces crafts on a full-time basis for consumers. Full-time specialization may create a more narrow range of goods than part-time household industry (Costin 1991:30-31). However, full-time specialists may also produce a number of different types of goods simultaneously (Wilk and Rathje 1982). Here, as in household industry, there ought to be relatively concentrated production materials or debris because production may be more intensive. However, in a workshop industry, craft specialization may be physically segmented from other activities. Production may be undertaken in specific locations in the settlement, possibly within specialized structures.

Household craft specialization, whether simple production or more intense industry, is visible in the archaeological record in several ways. Direct evidence of craft specialization may include remains of raw materials or equipment used in production. For example, in ceramic

manufacture, evidence may include tools used in forming, shaping, finishing or firing ceramic vessels. As well, uniformity in construction or decoration of vessels may indicate specialization and increased intensity. However, standardization of production through the use of molds may not be a good indicator of increased intensity because both sporadic and full-time producers of ceramics may use molds (P. Arnold 1991:96). Relatively high frequencies of specific types of finished products may be indirect evidence of craft specialization (e.g. Costin 1991; Charlton, Charlton and Nichols 1993; Smith 1994). However, these remains must be in pristine condition, rather than used, to be evidence of production.

Artifacts as Indicators of Household Activities or Wealth

The concept of "household" can be defined and interpreted in a variety of different ways, as discussed in Chapter One. Households ought not to be viewed as static agglomerations of related individuals. Instead, it is useful to view households as fluid, responsive units of production and consumption; that is, as overlapping spheres of activities (see Ashmore and Wilk 1988; Wilk 1991; Wilk and Netting 1984). Here, I discuss different types of artifacts found in rural household contexts and how they relate to the different types of activities household members may have performed.

One of the primary activities households undertake is production and consumption of agricultural goods. Rural

households produced crops primarily for their own consumption. However, some agricultural products may have been furnished to La Sierra as tribute to elites and other non-agricultural producers in urban contexts. Tribute demand is fundamental to chiefly and state-level hierarchies (see Carniero 1981; Earle 1987; Sahlins 1972).

Late Classic rural household artifactual evidence of agricultural production and consumption consists of a mixture of ground stone implements, including manos and metates. Manos are either circular or oval in cross-section. Both manos and metates are formed from vesicular basalt. Metates in the Late Classic Naco Valley generally have three leg supports, although there are a few examples from Site 262 of metates produced without leg supports. Manos and metates in the current sample contain no elaborate carved decoration and appear similar in form to those found in other areas of the southeast periphery.

The artifacts discussed above relate primarily to food processing and consumption, rather than actual production. This examination of rural households, whose primary activity during the rainy season was arguably farming, uncovered no evidence of basic agricultural tools, such as large bifaces that could have been used as hoes (e.g. McAnany 1992). Either household members stored these artifacts at some other location, such as a field house in the case of outfield farming (e.g. Netting 1977), or they used perishable implements, such as wooden hoes. Given the extensive

excavations in the Late Classic Naco Valley over the past ten years and the lack of a single biface that could have been used as a hoe (N. Ross, personal communication 1998), the evidence suggests the latter interpretation.

Hunting of wildlife may have been an activity undertaken by some households to supplement their agricultural production. Several households, discussed below, show some evidence of hunting based upon the presence of projectile points. Like many wood-carving implements (see below), projectile points found in rural household contexts appear to be informally produced, consisting of an altered obsidian prismatic blade. In the Maya lowlands, projectile points have been viewed as evidence of warfare (e.g. Webster 1976, 1993, 1998). However, the general lack of any independent evidence to support warfare (defensive or fortified location, bodily injury observed in burial material, etc.), and the extremely low frequency of projectile points in households, suggest that they functioned for hunting animals, rather than humans (for a single exception, see Henderson [1991] for discussion of a burial with indication of death by projectile point to rib).

Woodworking is another activity attested to in Late Classic rural households (e.g. Becker 1973). Hachas, or celts, that were most likely used as chisels, as well as drills, borers and gravers, employed in more detailed wood carving, represent this type of household activity. Celts may also have been used in ground stone production (e.g. Hayden 1986) (see discussion for Site 262). Lithic analysis indicates that

drills and gravers were casually produced by modifying obsidian prismatic blades (Ross 1997: Appendix A).

Household evidence of ceramic production is dispersed. Certainly, the best and most direct evidence of ceramic manufacture hails from evidence of kilns, although they are rare in Mesoamerica as a whole. While several kilns have been recovered in the Late Classic Naco Valley, they are concentrated in workshops in the urban core of La Sierra. Elites at the capital appear to have sought a monopoly over the fashioning of at least some ceramic containers and marine shell working (see Schortman and Urban 1994:410). However, some households in the hinterlands do appear to have produced ceramics, as evidenced by the presence of polishing stones and sherd disks. Sherd disks result from rounding the edges of sherds. Small disks with holes may suggest items of adornment or spindle whorls, rather than ceramic production tools. Larger disks, without biconically drilled holes, may have been used in the shaping of ceramic vessels before firing. Polishing stones may be used in burnishing pottery before firing. Pigment stones, if found in association with these other artifacts, may also suggest pottery manufacture. A limited number of households show evidence of figurine and ocarina manufacture through the presence of molds.

Paper and cloth manufacture in the rural areas of the Late Classic Naco Valley is evidenced by both direct and indirect evidence. Barkbeaters, oblong or rectangular groundstone objects with parallel grooves cut into one

surface, were used in antiquity for producing paper. Lack of evidence of a written language for Late Classic inhabitants of the valley, as well as the rarity of these goods, suggests that paper might have been traded to other areas of the southeast periphery. Alternatively, paper may have been used locally by elites in public ritual, such as letting blood. Stamps uncovered from a number of households suggest that paper or cloth decoration (Haviland 1981) was a common activity. While stamps are associated in other portions of Mesoamerica with textile decoration, direct evidence of cloth production, i.e. spindle whorls, is scant.

Several households in the sample also contain evidence of ground stone manufacture, including the production of manos, metates and hachas. The primary evidence for these activities is the presence of partially finished products, such as mano and metate roughouts. Generally, mano and metate roughouts are identified by their rough shapes and course texture. This course texture is especially important on grinding surfaces, as negative evidence of use wear. Some mano and metate roughouts may have unworked surfaces.

In some areas of Mesoamerica, the presence of even small amounts of these types of goods is taken as evidence for full-time production due to the limited number of households engaged in fashioning such goods (C. Charlton, T. Charlton and Nichols 1993: 161-2). Here, I examine all of the evidence before evaluating manufacturing intensity.

Outside of production activities, households may engage in a variety of other types of behaviors, including ritual. Four types of artifacts commonly associated with ritual activity are censers, candeleros, figurines and ocarinas (Gonlin 1993; Joyce 1993: Sheets 1992; Urban and Bell 1993; Widmer and Storey 1993). Censers, which are made in a variety of different types, were used commonly as receptacles for burning copal. Candeleros are low ceramic vessels containing holes of differing numbers and diameters, many of which show evidence of burning on their interiors. While enigmatic in function, they may be associated with domestic ritual activity. Figurines and ocarinas (whistles) are similar in paste, form and decorative elements and may have functioned as symbols of household deities (Widmer and Stone 1993).

Above, it was hypothesized that there may be a negative correlation between wealth and private ritual activity. While it is difficult to differentiate between public and private ritual activity in the archaeological record, different classes of goods may be associated with each. Public, possibly elite, ritual activity may be suggested by the use of rare, elite-controlled cult objects, such as stingray spines and/or spondylus shell (Schortman and Urban 1994). A Maya ahaw, or lord, may use these types of goods during public, ritual activity (e.g. Schele and Friedel 1990; Schortman and Urban 1994). Censers, candeleros, figurines and ocarinas, due to their ubiquity, may be more closely associated with private rituals.

Finally, some classes of household artifacts may suggest degrees of wealth. These include items of personal adornment, such as pendants and earspools. The limited distribution of such artifacts, as well as the ornate nature of the artifacts themselves, leads me to suspect that such personal artifacts may be related to wealth or status. However, there appears to be some differences in the characteristics of these items; while some are very ornate, others are rather simple. A limited number of households have access to stone sculptures, which may be an indicator of high status, rather than wealth. Production of these items would necessitate specialized skills as well as considerable labor. The restricted access of some households to these goods may indicate a higher level of status or wealth than other households.

CHAPTER FOUR

SMALL HOUSEHOLDS: ARCHITECTURE, ACTIVITIES AND WEALTH

Introduction

Household size has been documented as having an influence on a wide range of aspects of household life. For example, large households have been noted to possess and produce a wider variety of items than smaller households (Netting 1982). Smaller households may produce a more limited number of products, but with greater intensity. Large households tend to be wealthier (Netting 1982; Kramer 1979; Hayden and Cannon 1983; Wilk 1983; McGuire and Schiffer 1983; Lee and Hayden 1988). As households grow in size, their activities, and thus use of space, may change (McGuire and Schiffer 1983; see also Kent 1990, 1991).

Because of these differences between small and large households, Chapters Four and Five have been divided into discussions of small and large household excavations in the Late Classic Naco Valley, respectively.

The distinction between "small" and "large" households is based upon the bimodality of Late Classic settlement pattern size on classified soils, as illustrated in the attached stem and leaf plot (see Figure 4.1). This bimodal distribution breaks at eight structures per household. Therefore, households less than nine structures are considered small, while those with nine or more structures are considered large.

As noted in Chapter Two, households are partially defined by nucleation of structures, many constructed around central patios. If more than one nucleated group of structures are observed at a locale, they are considered part of the same household if located less than 50 meters apart. This close physical proximity of structures (a tight cluster) may reflect cooperative, close relationships and a shared identity among household members (Wilk 1984, 1991). Extended family households may locate themselves on the landscape in two ways: as co-residential, extended family households, with structures nucleated; or as non-residential, extended family households (or loose clusters [Wilk 1984,1991]), where structures are dispersed over a localized, or possibly extended, area (Nutini 1968:191-247). If two or more nucleated groups of structures are located less than 50 meters apart, this is interpreted as a non-residential, extended family household.

The present chapter investigates small households, ranging from two to five structures, located on all three soil classes. Chapter Five presents the results of studies conducted on four large households, ranging from 10 to 17 structures, placed on all three broad soil classes. These households were investigated either by the author or other members of the Naco Valley Archaeological Project between 1990 and 1996.

Organization of Small Household Discussion

Each small household site is discussed at two levels: the level of individual structures and of the household. Because households can be viewed as the maximum overlap of activity areas (Wilk 1991; see also Lightfoot 1994), individual structures are studied for indications of function and activities. In turn, this data is used in the aggregate to allow a discussion of household activities. Architecture of individual structures is studied and described, both to help reconstruct the functions of the structure, as well as to understand how the structure was altered through time. Together, this data on architecture and artifacts is used to discuss relative degrees of wealth and production intensity among households.

A Note on Chi-Square Analysis

Analysis of the frequency of different artifact categories is undertaken in Chapters Four, Five and Six, both in individual households (intrahousehold) and between different households (interhousehold). All chi-square tests are one-sample analyses. The expected frequency of the studied artifact categories is based upon the proportion of sherds excavated in that location (whether an individual structure within a household or the household in aggregate) to total sherds in the test sample. Expected proportions of artifacts under study are based upon sherd counts to help standardize

Therefore, both interior use of space and basal and interior dimensions are estimated from site plans.

Site 112 is the remains of a small household, possibly a field house, composed of two structures adjacent to one another, with a third located some distance to the southeast (see Figure 4.2). One of these buildings was investigated. Structure 112-1, with a basal area estimated to be 20.25 m^2, was a ground-level edifice bounded by low foundations measuring 0.20-0.40 m thick and constructed primarily of rough limestone blocks. The use of limestone blocks is unusual in the valley as a whole. However, these blocks are easily mined in the local vicinity. As a result, the use of this construction material ought not be seen as symbolic of wealthy occupants but, rather, as expedient use of easily available material. Interior space in Structure 112-1, estimated to be 16.8 m^2, is open, with no division of space by use of walls, benches, and so forth. While lateral clearing was not undertaken, benches are normally placed medially in residences. Therefore, the absence of a bench in these excavations indicates that no bench was present. However, a single large piece of cut block limestone was positioned on the floor's eastern side. The function of this block is unknown.

Artifacts associated with terminal occupation of the structure do not indicate any specialized household production (see Table 4.1). In fact, the lack of diversity in the household assemblage is striking, compared with most other

households in the study. The relatively high frequency of censer fragments (0.88 per 100 sherds), in conjunction with the single fragmentary example of a candelero and a figurine, indicate that the inhabitants of this structure performed relatively intense ritual activity during the structure's final occupation. The differential distribution of censer fragments among small households in this chapter is extremely significant (Chi-square = 45.82, df = 5, $p < 0.001$). Structure 112-1 contains more than four times the expected number of censer fragments, much higher than any other small household. Unfortunately, ceramic analysis is unavailable for this household other than for relative dating methods.

The simple, open design of Structure 112-1, as well as the extremely limited diversity of artifacts uncovered outside of those associated with ritual activities, indicates that the structure functioned as a field house in conjunction with limestone block extraction. There are some indications, based upon the lack of artifact diversity outside of censers, candeleros and figurines, that this structure functioned as a special-purpose structure related to ritual activity, or at the very least as a storage place for , among other things, ritual objects. The household's position on top of the hill, far from the nearest water source, suggests limited, possibly seasonal, occupation.

Site 262

Site 262 is located in the southeastern portion of the valley, on the Calcic Argiudolls class of soils. Anderson (1994a) states that the area surrounding this site is a pocket of some of the most fertile soil in the valley. This site consists of two small clusters of structures ca. 100 m apart and thus represents two distinct households (see Figures 4.3 and 4.4). The northern of these two groups was investigated in 1992 by Neil Ross (Arizona State University) and Lavinia True (Kent State University).

Site 262's northern cluster consists of five substantial structures, constructed in a tight cluster around a central patio. Structure 262-1, located in the central portion of the cluster, appears not to have undergone serious renovation after its initial construction. Because this structure was only partially excavated, basal and summit measurements are estimated. With a basal area of 81.9 m^2, Structure 262-1's summit was ascended on both the north and south by two terraces. The summit, estimated to measure 16.4 m^2, contains a central bench 1.4 m long and is divided unevenly into a large northern room and a cramped southern room by a narrow dividing wall, possibly a late addition. The summit is partially paved with cobbles.

Artifacts found in association with Structure 262-1 are similar in diversity to other structures associated with the household (see Table 4.2). The presence of mano and metate fragments, censer fragments and pigment stones indicates

multiple activities associated with the edifice, including food preparation and ritual performance. While the proportion of bowl rim sherds was similar to that noted in other household structures (see Figure 4.6), the proportion of imported and elaborately decorated ceramics appears significantly lower than the figures from Structure 262-3 and -4. Architectural evidence, including formal terraces, cobble paving and a central bench, indicates that Structure 262-1 functioned as a residence.

Structure 262-2 is a simple ground-level structure originally measuring 43.3 m^2 and devoid of built-in furniture. Located in the southeastern portion of the cluster, this platform originally contained an interior space measuring 17.9 m^2, significantly less than its basal dimensions due to the building's very thick boundary walls. During a subsequent renovation, this interior room was capped with earthen fill, creating a platform, and the edifice's basal dimensions were significantly enlarged via the addition of a large wall to the east, backed with fill to the level of the original basal wall height. This substantial renovation doubled the structure's area, to 95.2 m^2 and created a platform. Similar to the original design, the summit was devoid of built-in architectural features.

Structure 262-2's artifact assemblage indicates that multiple activities were preformed on and around the structure, including ritual activity, food preparation and consumption, wood working and ground stone tool manufacture.

The presence of mano and metate roughouts, without other evidence of ground stone manufacture, leads to the conclusion that, while they were stored in the structure, manufacture may have occurred in other household areas. The open summit, devoid of built-in furniture, indicates Structure 262-2 may have functioned as an ancillary structure, possibly a storage or work building.

Structure 262-3, located in the southern portion of the cluster, is a small platform that originally measured 23 m^2 and contained four summit rooms measuring 2.04 m^2, 1.54 m^2, 1.6 m^2 and 2.86 m^2. A central shelf was the only permanent furniture. During a subsequent renovation, a series of two steps on the east aided ascent of the summit. While interior space remained intact, a new terrace abutting the western side of the platform increased the basal area to 31.55 m^2.

The presence of bowls and jars, censers and barkbeaters indicates that food preparation and consumption, ritual and paper making were three central activities associated with the terminal occupation of Structure 262-3. Construction of a large shelf, located in the center of the platform, as well as a formal patio-side entrance, indicate the platform's function as a residence. The difference in the proportions of pigment stones between structures at this location is very significant (chi-square= 11.53, df = 4, $0.05>p>0.02$). This building contained nearly double the expected amount of pigment stones, possibly associated with ceramic, paper or metate decoration. The proportion of serving vessels was similar among all

structures in the household (see Figure 4.6), but the proportion of imported and elaborately decorated ceramics from Structure 262-3 is significantly high than that seen elsewhere at Site 262 (see Figure 4.5).

Structure 262-4, located adjacent to Structure 262-5, is a small platform that measures 18.48 m^2. Interior space was segmented into two rooms, each with a bench, measuring 5.4 m^2 and 2.86 m^2. During a later renovation, basal area was enlarged to 23.97 m^2 *via* construction of terraces on the north and west.

This diminutive platform, based upon the presence of two benches, is interpreted as a residence. Artifacts, including bowl and jar sherds, *mano* and *metate* fragments, censer, *ocarina* and figurine fragments, and projectile points, indicate conduct of diverse activities here, including food preparation and consumption, ritual observances and storage. Projectile points discovered in this structure may have been used to supplement farming with hunting. The limited number (2) of projectile points, as well as the casual nature of production, suggests hunting was an activity with limited significance to the household. Structure 262-4, like 262-3, has nearly double the expected proportion of pigment stones, which may indicate that decoration of either paper or ground stone products was conducted here. Finally, while a single, small stone jaguar sculpture was also recovered from this structure, it is unclear if this was a possession of the household, or if it was produced for consumption by others.

The latter possibility is based on evidence of ground stone production in the household.

Structure 262-5, directly to the north of Structure 262-4, may have been a late addition to the patio group, based upon its location outside the central structure cluster. The building originally consisted of a small platform measuring 6.5 m^2. The summit was segmented into three unequally sized rooms, measuring in area 3.9 m^2, 1.53 m^2 and 0.8 m^2. During this and subsequent periods, the summit was devoid of built-in furniture. Later, an additional room was constructed to the northwest, adding 7.98 m^2 to the total interior space and increasing basal area to 14.48 m^2. Architecturally, Structure 262-5 is similar to Structure 262-2 in its open use of space and lack of built-in furniture. These architectural elements suggest that Structure 262-5 functioned as an ancillary structure. Bowl and jar sherds, grounding stones, stamps and a barkbeater, and figurine, ocarina and censer fragments associate the structure with food preparation and consumption, paper production and decoration and ritual activity.

In sum, the household located in the northern cluster of Site 262 engaged in a wide variety of activities, from food preparation and hunting to more specialized activities, including paper and ground stone manufacture. The presence of multiple pigment stones in every structure may indicate that there was equal access to, and possibly cooperation in, decorating paper or ground stone. Of the three households containing pigment stones in this sample (located at Sites

262, 335 and 486), the differences in their proportions were highly significant (chi-square = 8.65, df = 2, 0.02>p>0.01). The household at Site 262 had nearly 70% more pigment stones than expected while the two latter households had only single examples, much less than the expected proportion. The evidence of more specialized activities, including the manufacture of paper and ground stones, was recovered in discrete loci, possibly indicating specific members in the household performed these tasks. Mano and metate roughouts were only discovered associated with Structure 262-2, an ancillary structure. Barkbeaters are associated with Structure 262-3, a residence, and Structure 262-5, an ancillary structure. Interestingly, in this household, any observed differences in the distribution of manos and metates are not significant (mano: chi-square=4, df=4, 0.5>p>0.2; metate: chi-square=3.51, df=4, 0.5>p>0.2).

Among large and small households that have ground stone, however, this household stands out with a much higher than expected, and highly significant, frequencies of manos and metates (mano:chi-square=11.1, df=5, 0.05>p>0.02; metate: chi-square=31.54, df=9, p<0.001). This indicates that while mano and metate use or production is concentrated at this location, these implements are evenly distributed among household structures.

How would one characterize the intensity of ground stone production in this household? While roughing out (estillar) the basic forms of manos and metates is done at the quarry

site among contemporary metateros in Mesoamerica, final shaping (afinar) may occur in the household compound (Cook 1982; Hayden 1987). However, at Site 262, there was no evidence of the types of tools normally associated with final shaping activities, such as pics (Hayden 1987:48-96) or hammerstones (Sheets 1992:117), nor was there debris associated with ground stone production. There is some ethnographic evidence to suggest that celts (hachas) may be used in the re-roughing (for their continued maintenances) of metate troughs, as evidenced by the blunting of hacha tips (Hayden 1987:96-101). The lack of hachas in this household indicates that, while ground stone goods were produced at this locale, they were not maintained.

Of course, lack of evidence of final finishing of these goods in the household does not necessarily mean that household members did not undertake these activities. Because excavations were focused on architectural elements of the household, it is possible that this evidence could be in other portions of the compound, where activities could have been performed or debris deposited. Minimization of effort among contemporary metateros affects their decisions as to where to perform various activities related to production (Hayden 1987:48). Therefore, it is possible that the bulk of the manufacturing process could have been undertaken at the quarry site, rather than at the household, using expedient tools. Finally, household production of ground stone may have been limited only to roughouts, with final shaping and refining

done at some other location, such as La Sierra (ground stone roughouts and finished products appear to be concentrated in Operation 32; see Schortman and Urban 1994: Table 1). The presence of matching numbers of mano and metate roughouts suggests they may have been prepared as sets for consumption by other households.

Therefore, based upon the data, it appears that production of ground stone at Site 262 was conducted on an independent, part-time basis. Only parts of a single structure in the household appear to have been related to this activity. The matching number of mano and metate roughouts may suggest their creation as paired sets, but the limited number of total mano and metate roughouts suggests this was not a full-time activity. While fashioning ground stone tools necessitates specialized skills and is time-consuming (Hayden [1987:48] estimates it takes roughly five days for a skilled, contemporary metatero to create a metate from beginning to end), they could have been undertaken on a part-time basis, during seasonal downtimes (e.g. D. Arnold 1985; Cook 1982; Wilk and Netting 1984). Certainly, while there is limited evidence of ground stone tool production in the valley during the Late Classic, this does not mean that full-time production of such implements was pursued at those specific loci where roughouts were found (cf. Charlton, Charlton and Nichols 1993:162). On the contrary, contemporary studies indicate that many rural contemporary metatero households are primarily

farmers and undertake ground stone manufacture to supplement their agricultural income (Cook 1982:129).

Site 267

Site 267 is located ca. 0.2 km east of Cerro El Regadillo, the limestone hill on which Site 112 commands the summit. Site 267 is situated on the border between Typic Hapludoll and Hapludoll soils, both very fertile agricultural lands. Anderson (1994) states that this area, adjacent to the large limestone outcropping, is one of several prime fertile pockets in the Naco Valley. Excavation was undertaken here during the 1990 season by Susan Buchmueller.

Site 267 consists of the remains of a small household, identified by two structures constructed adjacent to one another (see Figure 4.7). As with Site 112, both structures were investigated *via* axial trenches, with very limited lateral clearing. Therefore, internal space and basal dimensions are estimated from site plans.

Structure 267-1 is a small, unassuming structure covering an estimated 7.4 m^2 with a summit room measuring 6.75 m^2. Constructed of a mixture of rough limestone blocks and river cobbles, Structure 267-1 is entered on the east *via* a formal portal consisting of a single, 0.10 m high, riser. This diminutive structure contains no internally divided space and, like many structures in the Naco Valley, has an earthen floor.

Structure 267-2 is architecturally similar to its neighbor. Constructed of a mixture of limestone blocks, some

more finely cut than those in Structure 267-1, and river cobbles, Structure 267-2 measures basally an estimated 25 m². The edifice is entered on the west and east via two low (0.10-0.20 m) risers. Internally, the summit is estimated to encompass 18.5 m² and consists of an earthen floor with no internal division visible. For both structures, no artifacts beyond sherds were recovered from excavations (see Table 4.3). Unfortunately, ceramic analysis is unavailable beyond that used for relative dating methods.

These remains suggest a small household group that was perhaps seasonally occupied. These structures may have functioned as field houses associated with the rich agricultural land surrounding the location. Certainly, the difference in size between the two structures may signify functional difference (the smaller an ancillary structure, the larger a residence), but such an inference can not be substantiated from the sparse artifactual and architectural evidence. If architectural differences observed between Sites 112 and 267 are used to distinguish the two groups, Structures 267-1 and -2 appear to be relatively more finely constructed than Structure 112-1. While both structures at Site 267 were low platforms with formal entrances, Structure 112-1 was built at ground level and lacked a formal entrance. Of course, this discussion is largely qualitative; in quantitative terms, they would be virtually identical in terms of labor investment.

Site 288

Site 288, a four-structure group, represents the remains of a small household (see Figures 4.8, 4.9). Situated on the Argiudolls class of soils, Site 288 is on very fertile (Class I) terrain. However, excavation at this site revealed a deep layer (extending minimally 0.70 m below modern ground surface) of gravel and water-worn pebbles underlying portions of all structures excavated, which likely indicates flood activity at the location immediately prior to occupation of the site. This localized flooding may have made this area less desirable than other nearby areas. Site 288 was excavated during the 1996 season under the supervision of the author.

Structure 288-1 was originally constructed as a small platform rising ca. 0.80 m above ancient ground surface and measuring 10.5 m^2. The summit of this structure was divided into two relatively small spaces, measuring 3.0 m^2 and 2.4 m^2. These two rooms, on the north and south sides of the summit, respectively, are separated by a bench, the sole summit divider. Entry to the structure from the patio (southern) side was via a single 0.44 m high riser, while the northern, non-patio side was ascended by two narrow terraces.

Sometime after construction of the initial platform, renovations were undertaken that altered both access to the building and its summit space. With the completion of this renovation, access to the structure was only realized on the patio (southern) side of the building. During this period, the bench dividing the two summit rooms was widened to create a

northern room with a floor ca. 0.35 m higher than the southern room. While this type of construction is unusual in the valley, a similar bi-level summit style is seen in Structure 288-4. Late renovations did not affect the area of the southern room (2.40 m^2), but did allow an enlargement of the northern room to 6.60 m^2. This renovation did not affect the basal dimensions of the structure because the summit addition did not cover the older terrace.

Architectural evidence suggests that Structure 288-1 served as a residence was the presence of a centrally-placed bench. The presence of bowl and jar sherds, a lone metate fragment, and figurine and censer fragments indicate performance of multiple activities on and around the structure, including storage, preparation and consumption of food, and ritual (see Table 4.4). In all three excavated structures there is a general lack of evidence of grinding activities, as seen in the absence of manos and metates.

Structure 288-3 originally was constructed as a low (ca. 0.30 m tall), one room platform. Measuring minimally 7.50 m^2, this edifice supported a low, casually-built wall that partially, but not entirely, divided the interior into two areas. During a subsequent renovation, the building was extended 1.5 m to the south via a riser one-course high, that may have been backed with earthen fill. After this renovation, Structure 288-3 minimally measured 13.0 m^2. During its final occupation, then, there were two distinct spaces in the structure: the original structure, which was cobble-paved; and

the new addition, containing an earthen floor.

Architectural evidence suggests that Structure 288-3 functioned as an ancillary structure. The presence of bowl and jar rim sherds, figurine and censer fragments, and a single stamp and sherd disk indicate this structure sheltered storage, ritual activity and very limited household craft production. While containing no evidence of food processing, this building possibly functioned as a locale for food serving, similar to Structure 288-1, based upon confidence levels of the proportion of bowl rim sherds illustrated in Figure 4.10. The proportion of imported and elaborately decorated ceramics from Structure 288-3 is significantly high.

Structure 288-4 is the largest and most architecturally complex structure at the site. Measuring 35.4 m^2, this platform was originally constructed on two distinct levels, a lower patio side rising ca. 0.10 m above ancient ground surface, and an upper section to the south that rises an additional ca. 0.85 m to the summit level. The lower level measures minimally 2.9 m^2, but is estimated to measure 9.0 m^2. This lower summit room is an open area, with no visible division of space. The lower room is entered *via* an 0.80 m wide, centrally located, doorway to the patio. At the back of this front room three risers ascend 0.85 m to the level of the upper summit room. This upper summit room minimally measures 8.58 m^2, but is estimated to measure 13.0 m^2 and contains a centrally-placed bench. During later renovation of the

building, access to the upper summit room from the rear was facilitated by the construction of a low riser.

Architectural details, including formal front and rear entrances, bi-level construction and a central bench, suggest that this platform was a residence. Access to the rear summit room was limited, as was the case in Structure 288-1. The presence of bowl and jar sherds, metate fragments, and censer and figurine fragments indicates that multiple activities were undertaken in Structure 288-4, including storage, food preparation and consumption, and ritual activity. The proportion of bowl rim sherds from this structure is significantly low compared to its neighbors, as illustrated in Figure 4.10. This may indicate that storage and food preparation, rather than its actual consumption, was more a focus of activity at Structure 288-4.

In sum, the inhabitants of this household during its final occupation undertook many of the basic types of activities seen at other households in the valley. Food preparation and consumption, storage, ritual and limited amounts of craft production were pursued. Differences in the distribution of ritual artifacts are not very significant among household structures at Site 288 (figurine: chi-square=3.68, df=2, $0.2>p>0.1$; censers: chi-square=3.67, df=2, $0.2>p>0.1$).

Site 324

Site 324 is located in the northern portion of the valley, on the north side of the Río Manchaguala. This three-structure group, tightly clustered around a central patio, represents the remains of a small household (see Figures 4.12, 4.13). While Anderson (1994a) did not map the soil type around Site 324, he believes it to be good agricultural land, comparable to Class I soils (Anderson, personal communication 1997). The remains of this small household were excavated during the 1996 season under the direction of the author.

Structure 324-1 is a low platform located on the western side of the patio. During its initial construction, Structure 324-1 consisted of a low (ca. 0.30 m tall) platform measuring 10.8 m². Summit space was originally divided into two rooms by a centrally-placed bench, with floor space measuring 1.12 m² and 3.24 m². The larger, southeastern room contained a single elevated, stone-faced shelf.

During subsequent renovation, the structure's internal space and adjacent patio space were altered. During this period, the construction of an additional internal wall divided the northern room into two smaller ones. A second low stone surface, possibly functioning as a shelf, was constructed in the southwest portion of the platform, across from the original low shelf. In addition, two vertical, parallel lines of stone abut the northeastern patio side of the platform, fragmenting the patio space adjacent to the platform. This final renovation resulted in a small platform

with three distinct rooms on its summit, two in the northwestern portion measuring 1.12 m^2 and 0.96 m^2 and a larger room on the southeastern side of the medial bench measuring 3.24 m^2. This southern room contained two low stone-faced shelves.

Structure 324-1's architecture, specifically its large, medially placed bench, indicates that it may have functioned as a residence. The platform's artifactual assemblage, including bowl and jar rim sherds, mano and metate fragments, stamp fragments and numerous figurine pieces, indicates food preparation, consumption and storage, ritual and limited craft production, as evidenced by stamp fragments used in decoration of fabric or paper (see Table 4.5). As with Site 288, pigment stones were not recovered in association with the stamp fragments. Figurines fragments occur in relatively high frequencies in Structures 324-1 and 324-3, the two residential structures, but are virtually absent from Structure 324-2. These differences in the distribution of figurine fragments between structures are highly significant (chi-square=9.77, df=2, $0.01>p>0.001$). This may indicate that there is a degree of private ownership among nuclear families in extended family households, given the high frequency of figurines in residences. If figurines do represent a type of family or household deity (see Widmer and Storey 1993), then the relatively high frequency of censer fragments in the ancillary structure may indicate some differentiation between individual family and household ritual activity. While large error

ranges disallow high confidence, Structure 324-1 appears to have focused more heavily on food consumption than other structures (see Figure 4.14).

Structure 324-2 is located on the southern side of the patio group. A low platform, this edifice rises 0.24 m above ancient ground surface and measures 16.2 m². Access to the structure was aided by a sloping ramp on the patio-side of the platform. Originally, the summit of this platform was divided into four rooms, measuring in area 0.91 m², 0.81 m², 0.90 m² and 3.65 m². The largest of these rooms contains in its southern section two low (ca. 0.15 m), stone-faced shelves, possibly serving functions similar to those uncovered in Structure 324-1.

During a later period, this platform was renovated. While the alterations were minor, they affected the basal size of the structure, access to the summit rooms, as well as the internal division of space. On the northern side of the structure, a cobble and schist paved surface, with no visible external wall foundations (a ramada-type construction?), was erected, adding an additional 3.2 m² to the basal dimensions of the platform. This addition narrows the gap between Structures 324-2 and -3 to within 0.70 m. The summit gained three new internal walls, creating a total of five rooms, measuring 0.91 m², 0.81 m², 0.80 m², 1.43 m² and 2.6 m². The southern room, by far the largest, contained the two wide shelves constructed in the original version of the platform. The eastern most room in this edifice was paved with a flat

layer of schist. The ramada-type construction on the north created the sixth and final room.

The lack of residential features, such as a bench, as well as the extremely small size of rooms, indicates that this platform may have functioned as an ancillary structure. The presence of bowl and jar sherds, mano and metate fragments, and ocarina, figurine and censer pieces indicate that this structure served as a locus for domestic activities including food preparation, storage and ritual activity. There is no evidence of craft production associated with this structure. The relatively low frequency (0.08) of figurine fragments indicates that the other two structures, both residences, were the focus of figurine use (or storage, if figurines were personal property), rather than Structure 324-2. While any observed differences in the distribution of stamps among structures are not very significant (chi-square=3.03, df=2, $0.5>p>0.2$), there were no stamps recovered from Structure 324-2. Distribution of censer fragments between the three structures is highly significant (chi-square=8.79, df=2, $0.02>p>0.01$). Structure 324-2 appears to have been a focal point of other specific types of ritual activity (or a place for storage of ritual objects) as evidenced by the presence of more than double the expected number of censer fragments.

Structure 324-3 is located on the northeastern edge of the patio group. This edifice is the largest and most architecturally complex of the three structures at this site. During its initial construction, this platform measured 7.56

m^2 and rose ca. 0.40 m above ancient ground surface. The platform summit area measured 4.05 m^2 and contains a single bench in the small, one-room superstructure. Access to the platform was *via* a low riser on the patio side.

Major renovation occurred some time after the initial construction. A large, stone-paved surface, rising ca. 0.40 m above ancient ground surface and abutting the south side of the original structure, added meaningfully to the original platform, now measuring 23.03 m^2. While there was a single summit room in the original structure, there are now two, measuring 4.05 m^2 and 5.1 m^2. The original summit room still contains a bench. Formal access to the structure is now *via* two low risers on the southern, patio side of the structure.

Architectural features, including a formal, patio-side entrance, a central bench and the relatively large room size, indicate that Structure 324-3 functioned as a residence. The combination of extensive renovation and overall large size of the building may indicate that this platform was the original structure at the site. Bowl and jar sherds, *mano* and *metate* fragments, ocarina, figurine and censer fragments and a single stamp piece indicate that a variety of domestic activities took place on and around the structure, including food preparation and storage, ritual activities and very limited amounts of craft production, possibly paper or textile manufacture. The difference in the distribution of ocarina fragments in the household is highly significant (chi-square=9.77, df=2, $0.01>p>0.001$). Ocarina fragments are

concentrated in this residence. The proportion of imported and elaborately decorated ceramics associated with Structure 324-3 is significantly higher than comparable figures for Structure 324-2.

Taken as a whole, this small household engaged in a range of activities replicated in other households, including food preparation and consumption, ritual activity, and very limited amounts of craft production. While there is low confidence, due to large error ranges, it appears that Structure 324-1 may have served as a principal area of food consumption, relative to the other structures. Although the pattern of figurines used in residences and censers discarded in ancillary structures is not replicated in other households in such a clear fashion, this may indicate that figurines and censers were involved in two distinct, yet related, types of ritual activities. The differences in the distribution of figurine fragments among small households that contain them are extremely significant (chi-square=131.03, df=5, $p<0.001$). This household appears to have been a major focus of figurine consumption, relative to other small households. While relatively high frequencies of figurines, in some instances, may indicate their production, there is little evidence to suggest this at Site 324. First, no molds were recovered during excavations. Second, figurines associated with production ought to be in pristine condition for distribution, or ought to show signs of manufacturing errors; neither of these conditions were realized at Site 324. Any craft

production undertaken at this household appears to have been an independent, part-time undertaking.

Site 335

Site 335 is a small, three-structure group located in the northwestern portion of the valley, on the Eutrudox soil zone, an area with very poor agricultural potential (Class III) (see Figures 4.16, 4.17). It is located ca. 0.3 km from the nearest seasonal water source, the Quebrada Agria. All three structures at the site were completely cleared of overburden, allowing full examination of architecture and recovery of artifacts found in and immediately adjacent to the platforms. Site 335 was excavated during the 1992 season under the direction of Kim Sarnecki (Sarnecki 1993).

Structure 335-1 was originally a ground-level structure measuring 8.5 m^2 and created by the construction of four outerwalls rising ca. 0.30 m. The interior of this initial structure, measuring 6.0 m^2, was open save for a small corner room with stone paving measuring between 1.04 m^2 and 2.08 m^2. Later, this building was buried by a larger ediface placed directly on top of the first. This reconstruction essentially doubled the basal (16.4 m^2) and interior (11.9 m^2) areas. The structure's interior space was undifferentiated except for a summit bench placed on the southwest side of the building. Access to the building was via a small riser ascending from the patio.

Architectural features, including an interior bench and formal entrance, indicate this platform functioned as a residence by the end of its occupation. The structure's artifactual assemblage, including bowl and jar sherds, a single metate fragment, candelero, ocarina and censer fragments indicate that Structure 335-1 housed multiple domestic activities, including food preparation and consumption, and ritual (see Table 4.6). Ritual activity (or storage), as evidenced by censer fragments, was focused at this platform. The proportion of imported and elaborately decorated sherds from Structure 335-1 is significantly higher than the proportions from Structures 335-2 and -3, which are very similar to one another (see Figure 4.18).

Structure 335-2 was originally designed as a ground-level building with a basal area measuring 9.24 m^2. Constructed of four outer walls rising a preserved 0.65 m, the interior space of the edifice, measuring 5.76 m^2, was undivided and featureless, save for a shelf located along the northern wall. During a later remodeling, the southern portion of the structure was extended with a casual, low terrace, increasing basal area to 10.02 m^2. At this time, the interior of the structure was filled in, covering the earlier shelf and thus creating an entirely open, elevated earthen summit floor.

Structure 335-2 is interpreted as an ancillary structure based upon the platform's lack of summit features, as well as no formal entrance. There is little evidence of the activities conducted on and around this structure beyond food

storage and consumption and limited ritual activity, as evidenced by bowl and jar sherds and two ocarina fragments. There is no evidence of craft specialization or food preparation from this platform. Structure 335-2 has less artifact diversity compared to its neighbors.

Structure 335-3, in its final form, contains complex architecture that is the result of multiple renovations of the edifice. Originally, Structure 335-3 was a similar size to the others at the site, measuring 11.44 m^2. Bounded by four outer walls, Structure 335-1's summit was segmented by three walls that created four small rooms, measuring 0.5 m^2, 1.44 m^2, 0.8 m^2 and 0.96 m^2. At this time, there was no built-in furniture. Later, after completion of this initial construction, the building was renovated, adding on to the east and south of the structure, doubling the basal area to 21.36 m^2. At this time, two new, larger rooms to the east were constructed, measuring 1.56 m^2 and 1.54 m^2. The new, central room included a built-in bench. During this period the southwest room of the original building was filled in, creating a large (ca. 0.96 m^2) shelf or bench. Finally, during a second renovation, another new room was constructed in the northeast corner of the building, adding 1.04 m^2 to the summit, creating a total of 22.40 m^2. Additionally, on this eastern side a casually-constructed terrace allowed formal entry into the building. Therefore, the final version of this building possessed six separate rooms, two of which contained built-in furniture.

Structure 335-3 is interpreted to be a residence, based on the presence of multiple benches or shelves. Jar and bowl sherds, mano and metate fragments, candelero and ocarina fragments, hacha and hacha blanks, and a single barkbeater indicate that this platform housed multiple activities (or storage of items), including food preparation and consumption, ritual, woodworking, hacha manufacture and paper production. The presence of several benches and shelves, and both relatively small and large rooms, indicate that this residential structure may have been used for the storage of goods.

Overall, this three-structure household undertook diverse craft activities, including paper and hacha production. Due to their low frequencies, it appears that these were part-time, independent activities. While artifacts from fill contexts can muddle interpretations of household activities and strategies, it appears that during earlier periods even more diverse activities were undertaken, including possibly cloth or paper decoration with stamps and pigment stones. This may suggest a similar pattern of household production over several generations.

Site 486

Site 486 is located on the western side of the valley, ca. 0.2 km southeast of Site 485. This two-mound group is situated on flat terrain within the Hapludoll/Arguidoll soil zone (Class I), very good agricultural land (see Figure 4.20).

Site 486 excavations were supervised during the 1996 season by the author.

Structure 486-1 excavations revealed an original platform consisting of four thick, relatively tall (ca. 0.50 m high) outer walls constructed of horizontal courses of schist slabs and cobbles. The area bounded by these facings was filled in to form a single, elevated summit room with no spatial differentiation. This basal platform rose ca. 0.52 m above original ground surface and measured 11.2 m^2.

During a later renovation, two more rooms were added to the summit on the north. The first, a rectangular enclosure, measured 3.36 m^2. A second, located to the north of the first addition, measured 4.2 m^2 and is constructed directly in front of a newly constructed bench in the northern portion of the structure. At some point after this initial renovation of the edifice, the bench was extended and a niche or shelf was placed into the bench.

At the end of the occupation of Structure 486-1, therefore, there were three distinct spaces atop the edifice's summit which, itself, measured 21.6 m^2. On the building's southern summit, an open, undefined space devoid of built-in architectural features measured 11.2 m^2. On the building's north summit, two more rooms, measuring 3.36 m^2 and 4.20 m^2 respectively, contained specialized built-in architectural features, including a bench and niche. Though complex Structure 486-1's architecture is relatively casual, lacking

detail, many of the additions were poorly constructed compared to renovations seen on other buildings.

Compared to some other small sites in this sample, the household assemblage from terminal occupation contexts of Structure 486-1 is relatively diverse and indicates several different types of household activities initiated by the prehistoric inhabitants of this residential platform. Beyond food production and consumption, ritual activity is implied by the presences of all four types of ritual-related artifacts (see Table 4.7). Among small households, the differences in the distribution of candeleros is somewhat significant (chi-square=5.73, df=3, $0.2>p>0.1$). This household contains more than double the expected proportion of candelero fragments. However, even so, with only two fragments recovered, the strength of this difference is weak. As well, individuals of this household undertook decoration of paper or textiles (stamp and pigment stones), woodworking (hacha) and possibly the production of pendants. The difference in the distribution of stamps in small households is fairly significant (chi-square=7.23, df=3, $0.1>p>0.05$). This household had more than three times the expected proportion of stamps. While there is no direct evidence of production of pendants, the two examples uncovered are made of thin layers of schist, which is easily available locally; schist is a common construction material in the houses excavated in the area. Both pendants are roughly the same shape and biconically drilled. This evidence, combined with the rarity of pendants among the households in

structure function. This large difference, both in terms of area and its associated energy cost, may reflect differences in the wealth of individual nuclear families in the larger extended family household, or power, as manifest in labor control. There is a negative relationship between structure size and imported and elaborately decorated ceramics; those household members with smaller houses appear to have significantly higher proportions of these artifacts. There does not appear to be any house at Site 262, relatively large or small, that is offering feasts more readily than any other. There is, however, the possibility that these smaller houses may have doubled as storage receptacles for valuables owned by the household as a unit or the occupants of the larger structures.

Generally, none of these households distinguished themselves by intensifying production beyond the part-time, independent level. There is no direct evidence of attached specialization being undertaken by small households. As was suggested, the lack of finishing tools associated with ground stone production at Site 262 may indicate that roughouts were exported to La Sierra for final finishing. This may, or may not, suggest attached production.

The household at Site 262 distinguished itself with the only examples of mano and metate roughouts, as well as a moderately high frequency of metate fragments. The differences in the distribution of metate fragments among small households is somewhat significant (chi-square=8.36, df=5, $0.2>p>0.1$).

This household also displayed a disproportionately high number of pigment stones, possibly associated with decoration of ground stone. The difference in the distribution of pigment stones among small households is highly significant (chi-square=8.65, df=2, 0.02>p>0.01).

The household at site 324 appears to have focused more heavily on some types of ritual activity, compared to other households. Ocarinas, figurines, and censer fragments all were common and the differences were highly significant at this locale (ocarinas: chi-square=15.58, df=5, 0.01>p>0.001; figurines: chi-square=131.03, df=5, p<0.001; censers: chi-square=45.82, df=5,p<0.001). While the household at Site 324 concentrated on several different types of associated ritual activities, the field house at Site 112 had an even higher frequency of censer fragments, over four times the expected proportion. Note that both Site 112 and 324 are located in areas which have prime views of the open valley floor.

Finally, the household at Site 486 distinguished itself by its use of stamps, with over three times the expected proportion. Differences in the distribution of stamps in small households are fairly significant (chi-square=7.23, df=3, 0.1>p>0.05). As noted above, this household further distinguished itself by containing a fairly diverse assemblage of artifacts.

Estimates of the mean proportion of bowl rim sherds per small household, illustrated in Figure 4.22, indicates that all are clustered similarly between 35% and 45%. Any observed

differences are most likely due to the vagaries of sampling. This may indicate that no small household undertook more feasting rituals than any other household. The highest proportion of bowl rim sherds per household, as illustrated in Figure 4.23, indicates that there may be two groups: households 262, 335 and 486 between 40% and 50% and households 288 and 324 hovering around 60%. However, large error ranges do not allow stating such a distinction with high confidence.

Some houses appear to have feasted more readily than other houses within a household. Any observed differences in the proportions of bowl rim sherds between structures at Site 262 are most likely due to the vagaries of sampling. Among buildings at Site 288, Structures 288-1 and 288-2 contain a significantly higher proportion than Structure 288-3. Here, as at Site 262, there appears to be no difference based upon structure function; one is a residence, the other an ancillary structure. At Site 324, it appears that Structure 324-1 has a higher proportion of bowl rim sherds than the other two structures. However, large error ranges do not allow high confidence. All structures at Site 335 appear to be similar in their proportion of serving vessels.

Estimates of the mean proportion, as well as the highest proportion, of imported and elaborately decorated sherds per small household, as seen in Figures 4.24 and 4.25, illustrate similar patterns. The differences in both mean and highest proportion between households 262 and 288 and 324, 335 and 486

are highly significant. While the differences may be only 1% or 2%, the strength is great.

In conclusion, it has been shown that small households do illustrate diversity in buildings and behaviors. While the mean size of structures may not differ significantly, certain households do tend to have much more variation in structure size than others. There appears, however, to be little relationship between house size and other indicators of wealth, such as the mean proportions of bowl rim sherds or elaborately decorated or imported ceramics. Certain households appear to focus more heavily on specific activities than others. Some households, as observed in their proportions of imported and elaborately decorated ceramics, illustrate higher wealth than others. While these differences may appear on the surface to be slight, they have high significance.

Table 4.1 Site 112 Household Assemblage

Artifact Category	Str. 1		Total	
Mano fragment	0	(0.00)	0	(0.00)
Mano roughout	0	(0.00)	0	(0.00)
Metate fragment	0	(0.00)	0	(0.00)
Metate roughout	0	(0.00)	0	(0.00)
Candelero fragment	1	(0.06)	1	(0.06)
Ocarina fragment	0	(0.00)	0	(0.00)
Stamp fragment	0	(0.00)	0	(0.00)
Figurine fragment	1	(0.06)	1	(0.06)
Figurine mold	0	(0.00)	0	(0.00)
Polishing stone	0	(0.00)	0	(0.00)
Pigment stone	0	(0.00)	0	(0.00)
Hacha	0	(0.00)	0	(0.00)
Hacha blank	0	(0.00)	0	(0.00)
Barkbeater	0	(0.00)	0	(0.00)
Censer fragment	14	(0.88)	14	(0.88)
Sherd disk	0	(0.00)	0	(0.00)
Pendant	0	(0.00)	0	(0.00)
Earspool	0	(0.00)	0	(0.00)
Sculpture	0	(0.00)	0	(0.00)
Drill/borer	0	(0.00)	0	(0.00)
Graver	0	(0.00)	0	(0.00)
Projectile point	0	(0.00)	0	(0.00)
Sherds	1600		1600	

Note: All numbers in parenthesizes are frequencies per hundred sherds. Artifact frequencies for each individual structure are relative to that structure. Total counts and artifact frequencies are based on artifacts for the household.

Table 4.2 Site 262 Household Assemblage

Artifact Category	Str. 1		Str. 2		Str. 3		Str. 4		Str. 5		Total	
Mano fragment	2	(0.15)	1	(0.04)	2	(0.09)	1	(0.02)	1	(0.04)	7	(0.05)
Mano roughout	0	(0.00)	2	(0.07)	0	(0.00)	0	(0.00)	0	(0.00)	2	(0.01)
Metate fragment	3	(0.22)	4	(0.14)	6	(0.26)	6	(0.14)	2	(0.07)	21	(0.15)
Metate roughout	0	(0.00)	2	(0.07)	0	(0.00)	0	(0.00)	0	(0.00)	2	(0.01)
Candelero fragment	0	(0.00)	1	(0.04)	0	(0.00)	0	(0.00)	0	(0.00)	1	(0.01)
Ocarina fragment	0	(0.00)	3	(0.11)	5	(0.22)	13	(0.29)	2	(0.07)	23	(0.17)
Stamp fragment	1	(0.09)	0	(0.00)	0	(0.00)	1	(0.02)	1	(0.04)	2	(0.01)
Figurine fragment	2	(0.15)	4	(0.14)	3	(0.13)	5	(0.11)	5	(0.11)	19	(0.14)
Figurine mold	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Polishing stone	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Pigment stone	2	(0.15)	2	(0.07)	7	(0.30)	12	(0.27)	0	(0.00)	23	(0.17)
Hacha	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Hacha blank	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Barkbeater	0	(0.00)	0	(0.00)	1	(0.04)	0	(0.00)	1	(0.04)	2	(0.01)
Censer fragment	4	(0.30)	2	(0.07)	14	(0.61)	11	(0.25)	6	(0.22)	37	(0.27)
Sherd disk	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Pendant	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Earspool	0	(0.00)	1	(0.07)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Sculpture	0	(0.00)	0	(0.00)	0	(0.00)	1	(0.02)	0	(0.00)	1	(0.01)
Drill/borer	1	(0.07)	1	(0.04)	0	(0.00)	0	(0.00)	0	(0.00)	2	(0.01)
Graver	0	(0.00)	2	(0.07)	1	(0.04)	0	(0.00)	0	(0.00)	3	(0.02)
Projectile point	0	(0.00)	0	(0.00)	0	(0.00)	2	(0.05)	0	(0.00)	2	(0.01)
Sherds	1337		2846		2314		4416		2743		13,656	

Note: All numbers in parenthesizes are frequencies per hundred sherds. Artifact frequencies for each individual structure are relative to that structure. Total counts and artifact frequencies are based on artifacts for the household.

Table 4.3 Site 267 Household Assemblage

Artifact Category	Str. 1		Str. 2		Total	
Mano fragment	0	(0.00)	0	(0.00)	0	(0.00)
Mano roughout	0	(0.00)	0	(0.00)	0	(0.00)
Metate fragment	0	(0.00)	0	(0.00)	0	(0.00)
Metate roughout	0	(0.00)	0	(0.00)	0	(0.00)
Candelero fragment	0	(0.00)	0	(0.00)	0	(0.00)
Ocarina fragment	0	(0.00)	0	(0.00)	0	(0.00)
Stamp fragment	0	(0.00)	0	(0.00)	0	(0.00)
Figurine fragment	0	(0.00)	0	(0.00)	0	(0.00)
Figurine mold	0	(0.00)	0	(0.00)	0	(0.00)
Polishing stone	0	(0.00)	0	(0.00)	0	(0.00)
Pigment stone	0	(0.00)	0	(0.00)	0	(0.00)
Hacha	0	(0.00)	0	(0.00)	0	(0.00)
Hacha blank	0	(0.00)	0	(0.00)	0	(0.00)
Barkbeater	0	(0.00)	0	(0.00)	0	(0.00)
Censer fragment	0	(0.00)	0	(0.00)	0	(0.00)
Sherd disk	0	(0.00)	0	(0.00)	0	(0.00)
Pendant	0	(0.00)	0	(0.00)	0	(0.00)
Earspool	0	(0.00)	0	(0.00)	0	(0.00)
Sculpture	0	(0.00)	0	(0.00)	0	(0.00)
Drill/borer	0	(0.00)	0	(0.00)	0	(0.00)
Graver	0	(0.00)	0	(0.00)	0	(0.00)
Projectile point	0	(0.00)	0	(0.00)	0	(0.00)
Sherds	NA		NA		NA	

Note: All numbers in parenthesizes are frequencies per 100 sherds. Artifact frequencies for each individual structure are relative to that structure. Total counts and artifact frequencies are based on total artifacts for the household.

Table 4.4 Site 288 Household Assemblage

Artifact Category	Str. 1		Str. 3		Str. 4		Total	
Mano fragment	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Mano roughout	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Metate fragment	1	(0.09)	0	(0.00)	3	(0.09)	4	(0.07)
Metate roughout	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Candelero fragment	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Ocarina fragment	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Stamp fragment	0	(0.00)	1	(0.06)	0	(0.00)	1	(0.02)
Figurine fragment	4	(0.35)	4	(0.26)	3	(0.09)	11	(0.18)
Figurine mold	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Polishing stone	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Pigment stone	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Hacha	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Hacha blank	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Barkbeater	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Censer fragment	1	(0.09)	4	(0.26)	2	(0.06)	7	(0.12)
Sherd disk	0	(0.00)	1	(0.06)	0	(0.00)	1	(0.02)
Pendant	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Earspool	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Sculpture	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Drill/borer	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Graver	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Projectile point	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Sherds	1155		1540		3286		5981	

Note: All numbers in parenthesizes are frequencies per hundred sherds. Artifact frequencies for each individual structure are relative to that structure. Total counts and artifact frequencies are based on total artifacts for the household.

Table 4.5 Site 324 Household Assemblage

Artifact Category	Str. 1		Str. 2		Str. 3		Total	
Mano fragment	2	(0.10)	2	(0.16)	1	(0.04)	5	(0.08)
Mano roughout	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Metate fragment	2	(0.10)	2	(0.16)	3	(0.11)	7	(0.12)
Metate roughout	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Candelero fragment	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Ocarina fragment	0	(0.00)	1	(0.08)	10	(0.38)	11	(0.19)
Stamp fragment	3	(0.15)	0	(0.00)	1	(0.04)	4	(0.07)
Figurine fragment	25	(1.23)	1	(0.08)	28	(1.06)	54	(0.92)
Figurine mold	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Polishing stone	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Pigment stone	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Hacha	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Hacha blank	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Barkbeater	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Censer fragment	3	(0.15)	9	(0.74)	7	(0.27)	19	(0.32)
Sherd disk	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Pendant	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Earspool	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Sculpture	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Drill/borer	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Graver	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Projectile point	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Sherds	2038		1213		2634		5885	

Note: All numbers in parenthesizes are frequencies per hundred sherds. Artifact frequencies for each individual structure are relative to that structure. Total counts and artifact frequencies are based on total artifacts for the household.

Table 4.6 Site 335 Household Assemblage

Artifact Category	Str. 1		Str. 2		Str. 3		Total	
Mano fragment	0	(0.00)	0	(0.00)	2	(0.10)	2	(0.04)
Mano roughout	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Metate fragment	1	(0.04)	0	(0.00)	1	(0.05)	2	(0.04)
Metate roughout	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Candelero fragment	1	(0.04)	0	(0.00)	1	(0.05)	2	(0.04)
Ocarina fragment	2	(0.09)	2	(0.24)	2	(0.10)	6	(0.11)
Stamp fragment	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Figurine fragment	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Figurine mold	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Polishing stone	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Pigment stone	0	(0.00)	0	(0.00)	1	(0.05)	1	(0.02)
Hacha	0	(0.00)	0	(0.00)	1	(0.05)	1	(0.02)
Hacha blank	0	(0.00)	0	(0.00)	2	(0.10)	2	(0.04)
Barkbeater	0	(0.00)	0	(0.00)	1	(0.05)	1	(0.02)
Censer fragment	7	(0.31)	0	(0.00)	0	(0.00)	7	(0.13)
Sherd disk	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Pendant	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Earspool	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Sculpture	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Drill/borer	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Graver	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Projectile point	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Sherds	2285		849		2113		5247	

Note: All numbers in parenthesizes are frequencies per hundred sherds. Artifact frequencies for each individual structure are relative to that structure. Total counts and artifact frequencies are based on total artifacts for the household.

Table 4.7 Site 486 Household Assemblage

Artifact Category	Str. 1		Total	
Mano fragment	0	(0.00)	0	(0.00)
Mano roughout	0	(0.00)	0	(0.00)
Metate fragment	4	(0.16)	4	(0.16)
Metate roughout	0	(0.00)	0	(0.00)
Candelero fragment	2	(0.08)	2	(0.08)
Ocarina fragment	1	(0.04)	1	(0.04)
Stamp fragment	3	(0.12)	3	(0.12)
Figurine fragment	2	(0.08)	2	(0.08)
Figurine mold	0	(0.00)	0	(0.00)
Polishing stone	0	(0.00)	0	(0.00)
Pigment stone	1	(0.04)	1	(0.04)
Hacha	1	(0.04)	1	(0.04)
Hacha blank	0	(0.00)	0	(0.00)
Barkbeater	0	(0.00)	0	(0.00)
Censer fragment	5	(0.20)	5	(0.20)
Sherd disk	1	(0.04)	1	(0.04)
Pendant	2	(0.08)	2	(0.08)
Earspool	0	(0.00)	0	(0.00)
Sculpture	0	(0.00)	0	(0.00)
Drill/borer	0	(0.00)	0	(0.00)
Graver	0	(0.00)	0	(0.00)
Projectile point	0	(0.00)	0	(0.00)
Sherds	2487		2487	

Note: All numbers in parenthesizes are frequencies per hundred sherds. Artifact frequencies for each individual structure are relative to that structure. Total counts and artifact frequencies are based on total artifacts for the household.

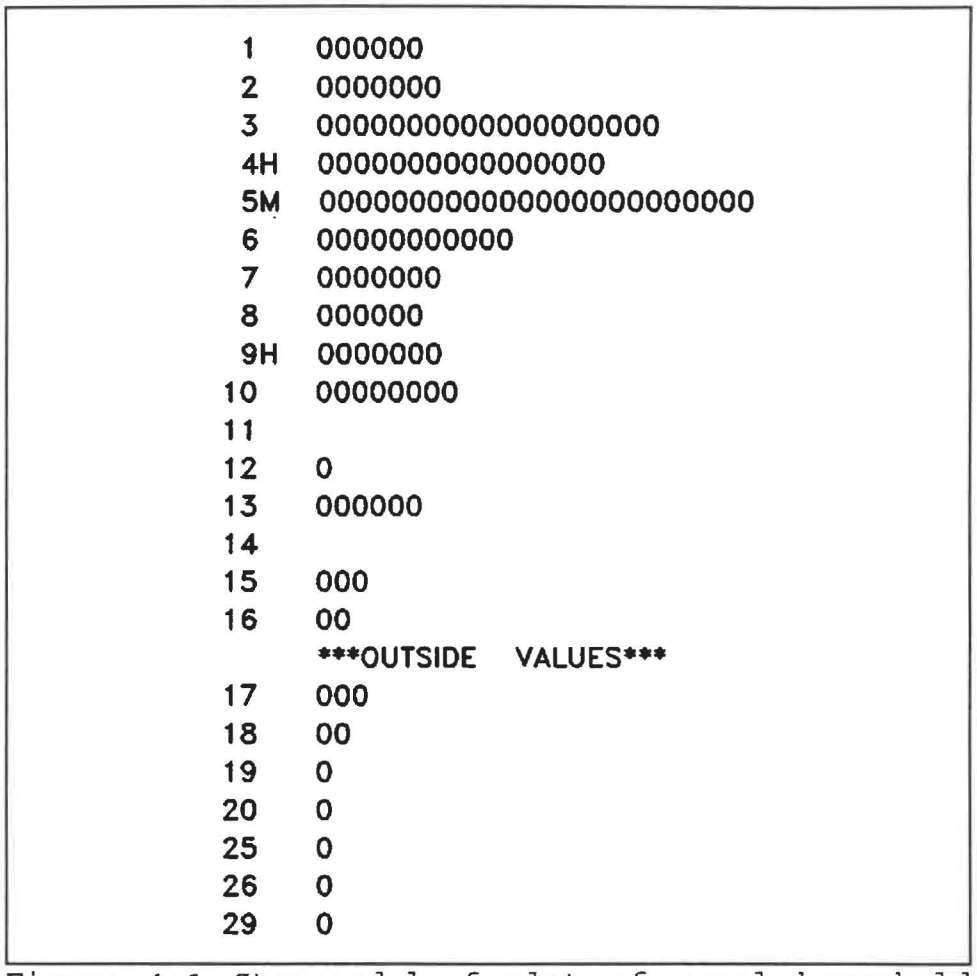


Figure 4.1 Stem-and-leaf plot of rural household size on classified soils in the Late Classic Naco Valley.

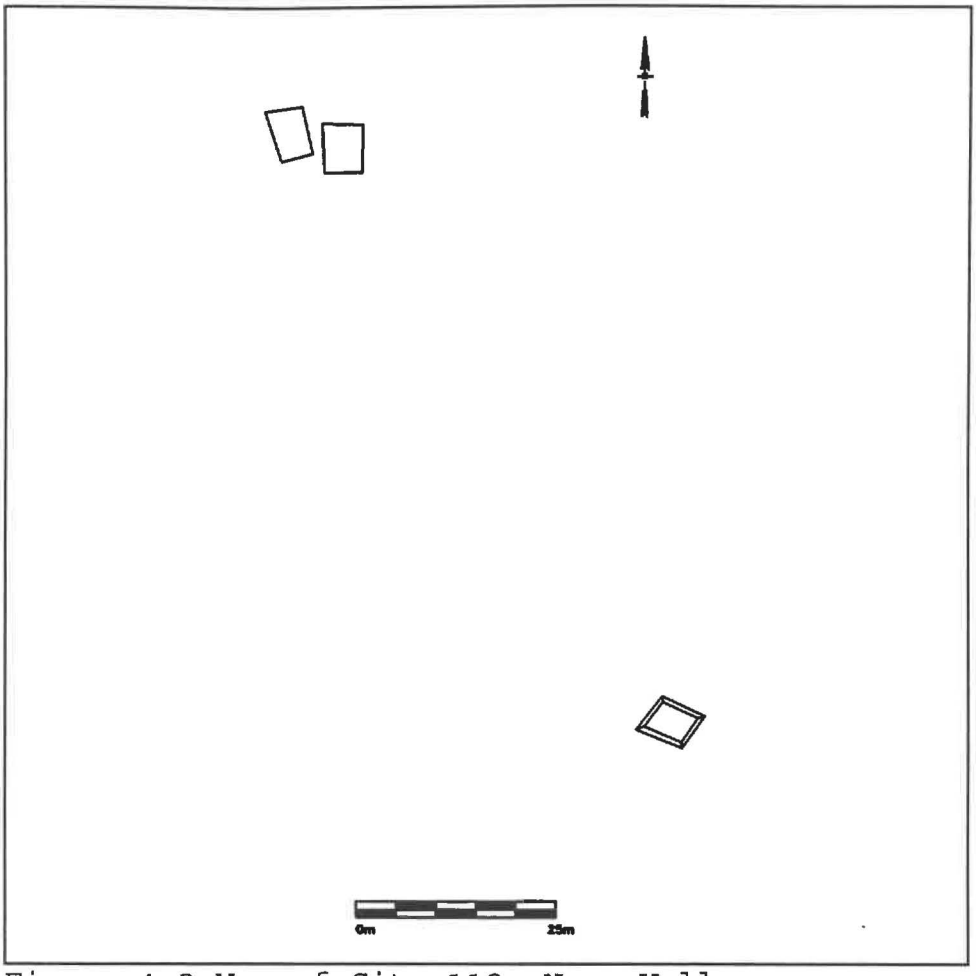


Figure 4.2 Map of Site 112, Naco Valley

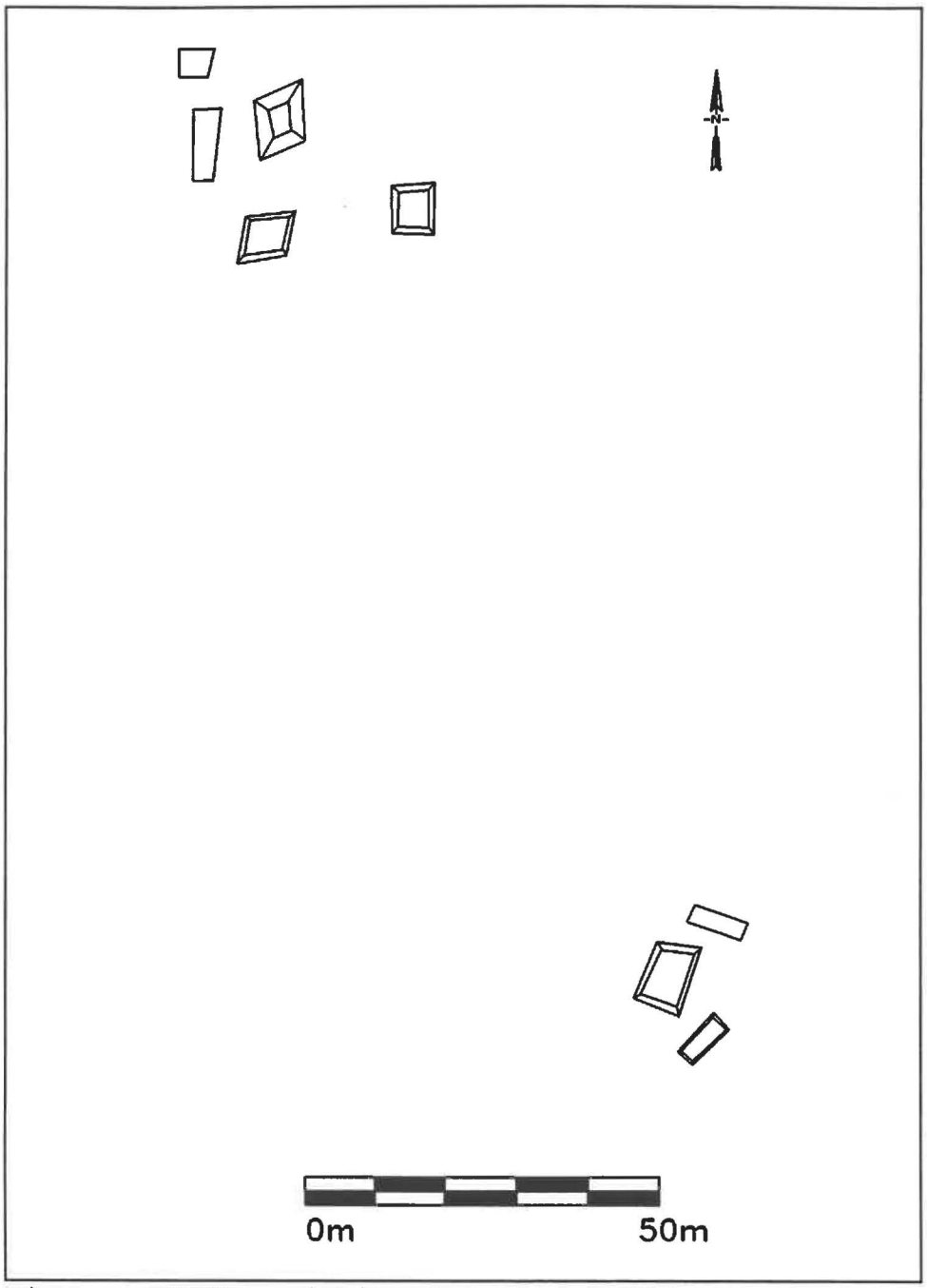


Figure 4.3 Map of Site 262, Naco Valley.

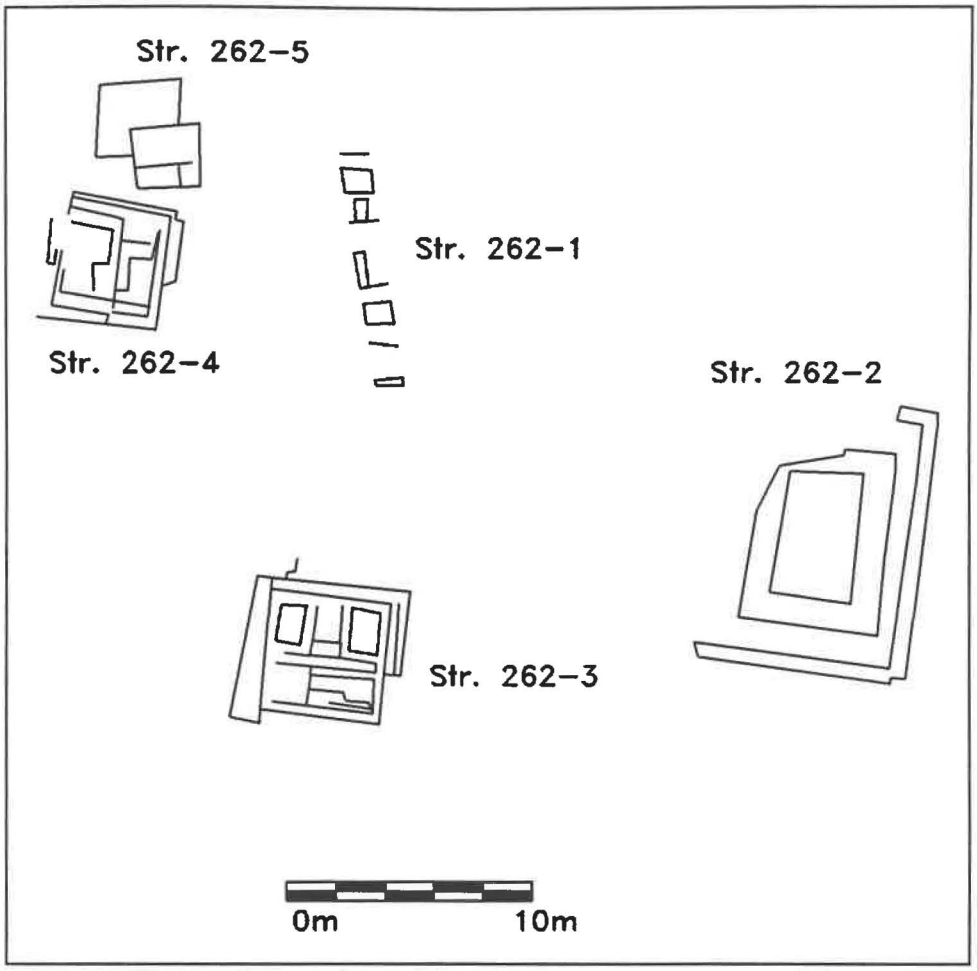


Figure 4.4 Plan view of Site 262, Naco Valley.

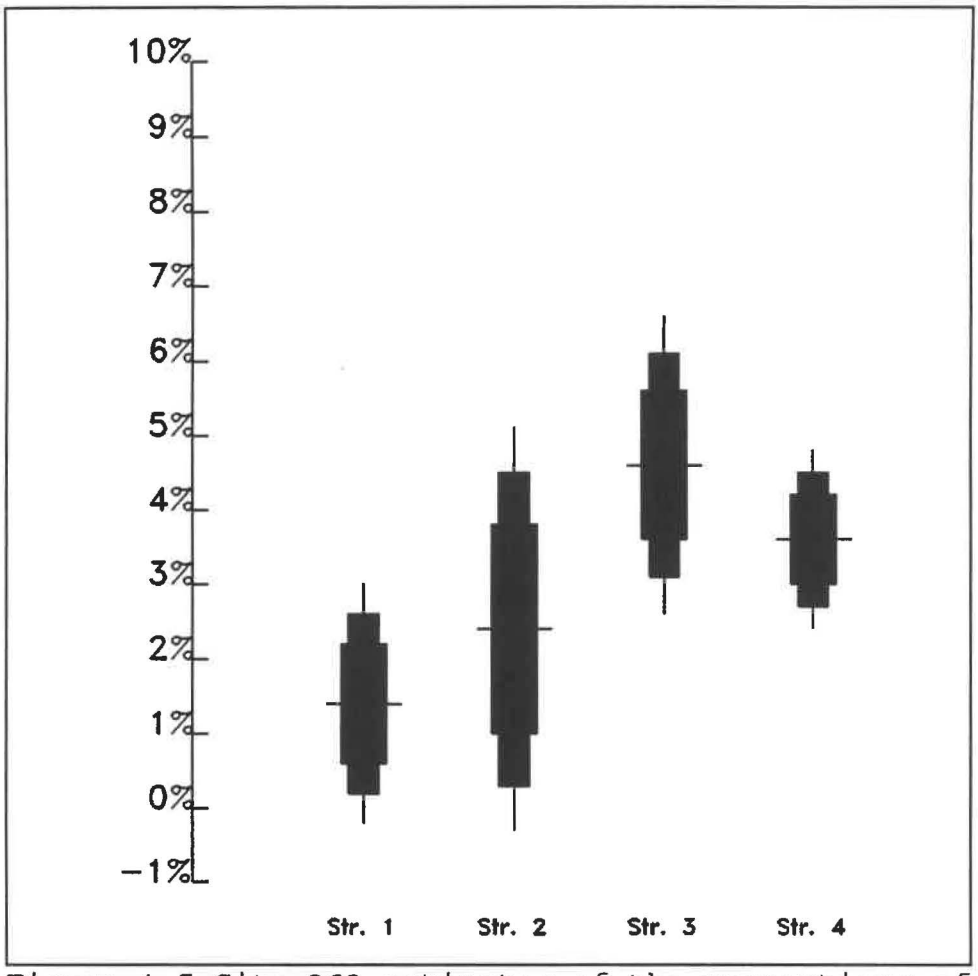


Figure 4.5 Site 262 estimates of the proportions of imported and elaborately decorated ceramics per structure with error ranges for 80%, 95% and 99% confidence levels.

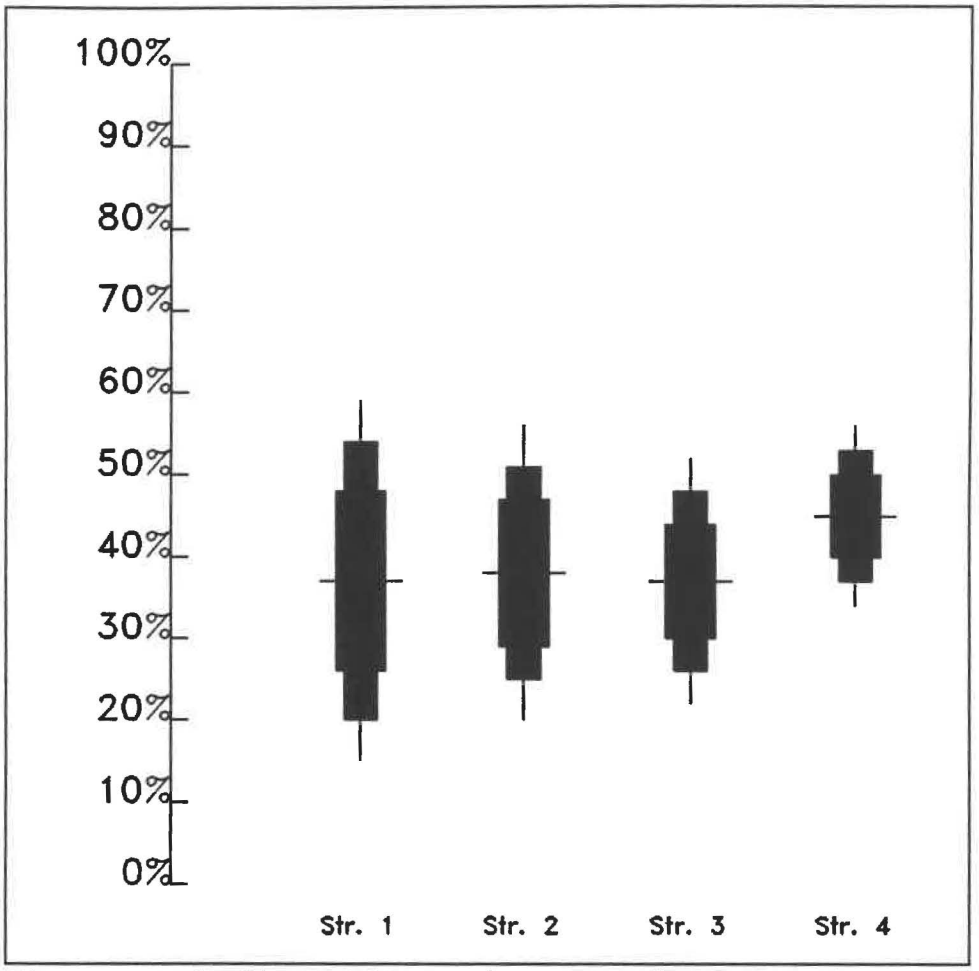


Figure 4.6 Site 262 estimates of proportions of bowl rim sherds per structure with error ranges for 80%, 95% and 99% confidence levels.

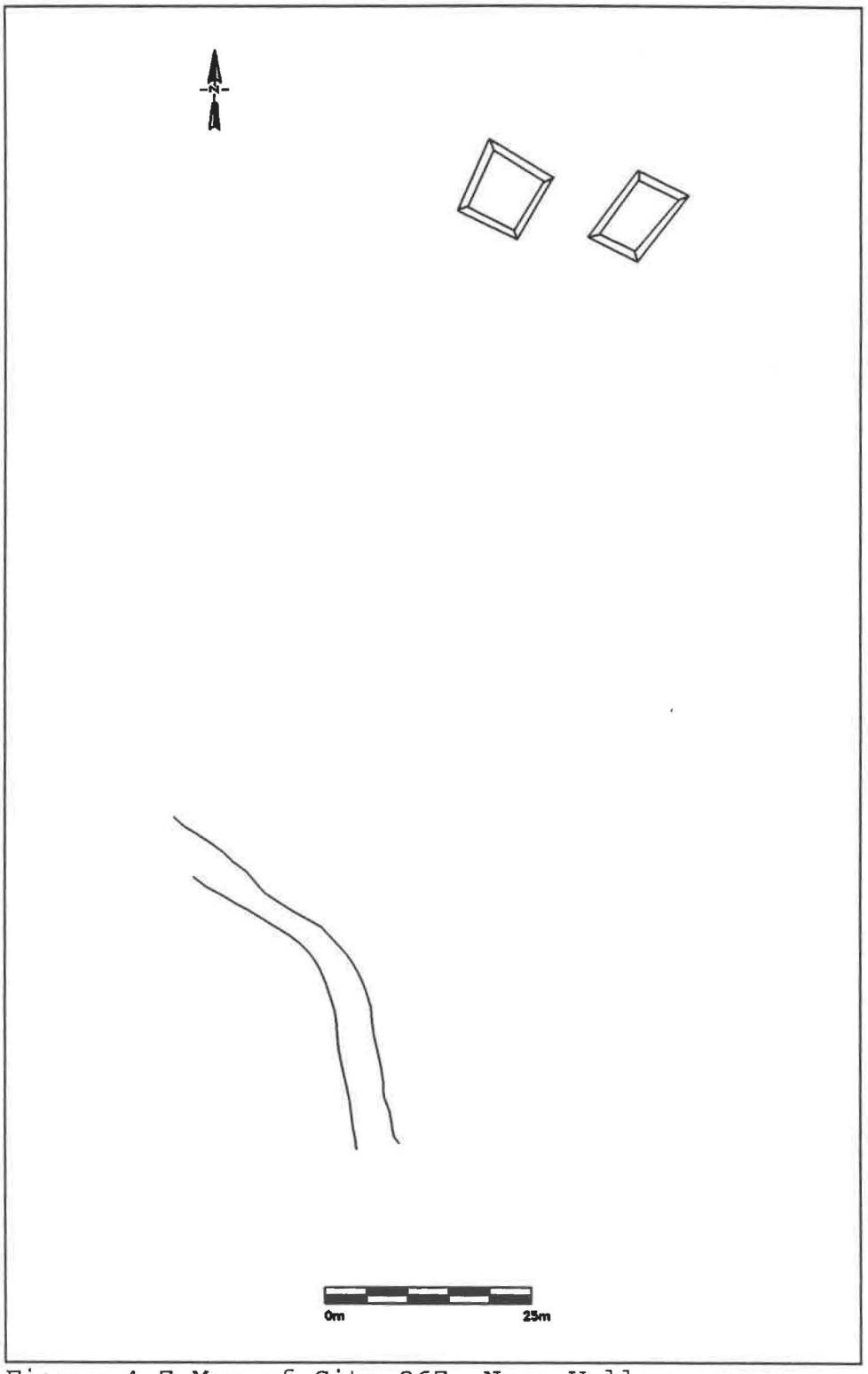


Figure 4.7 Map of Site 267, Naco Valley.

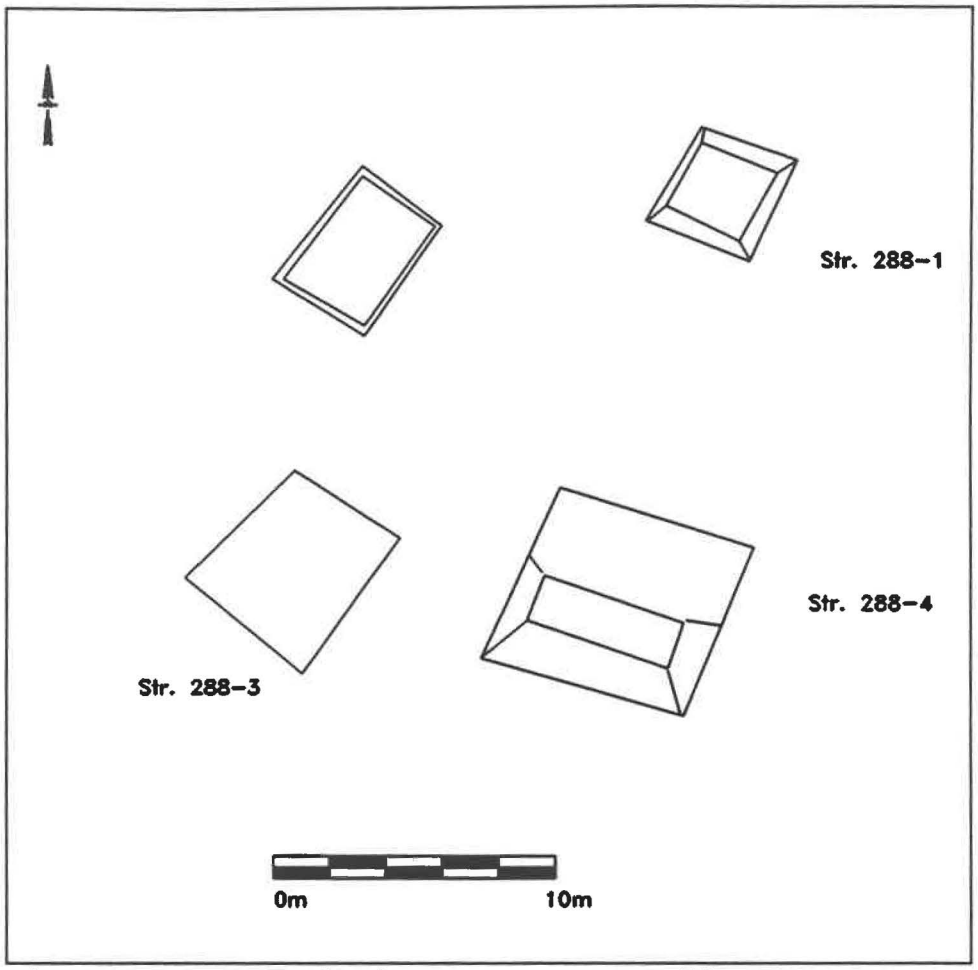


Figure 4.8 Map of Site 288, Naco Valley.

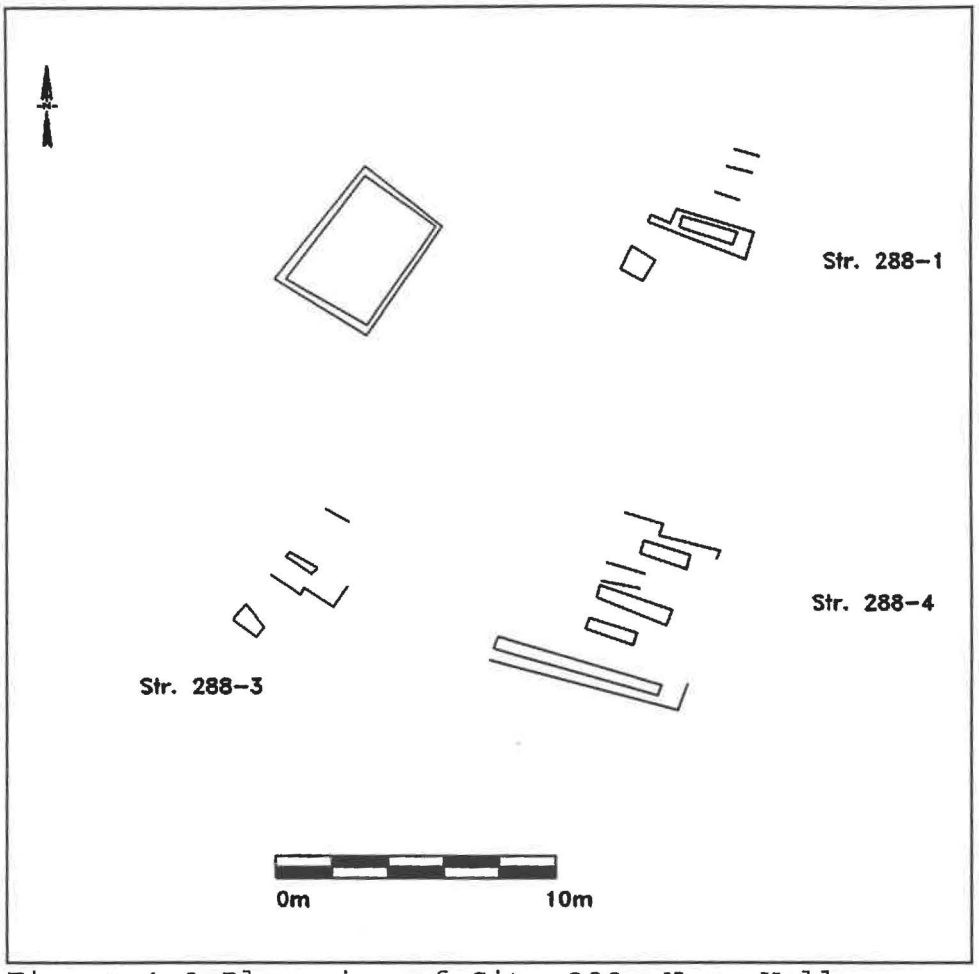


Figure 4.9 Plan view of Site 288, Naco Valley.

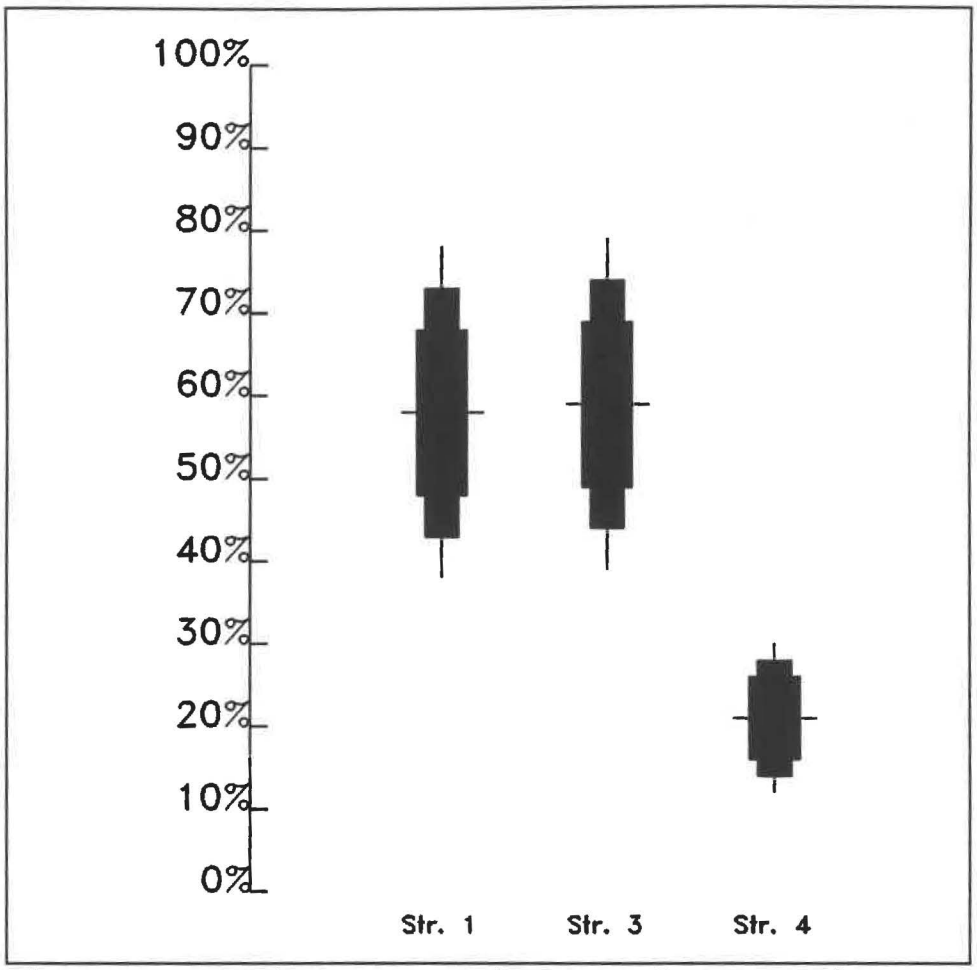


Figure 4.10 Site 288 estimates of proportions of bowl rim sherds per structure with error ranges for 80%, 95% and 99% confidence levels.

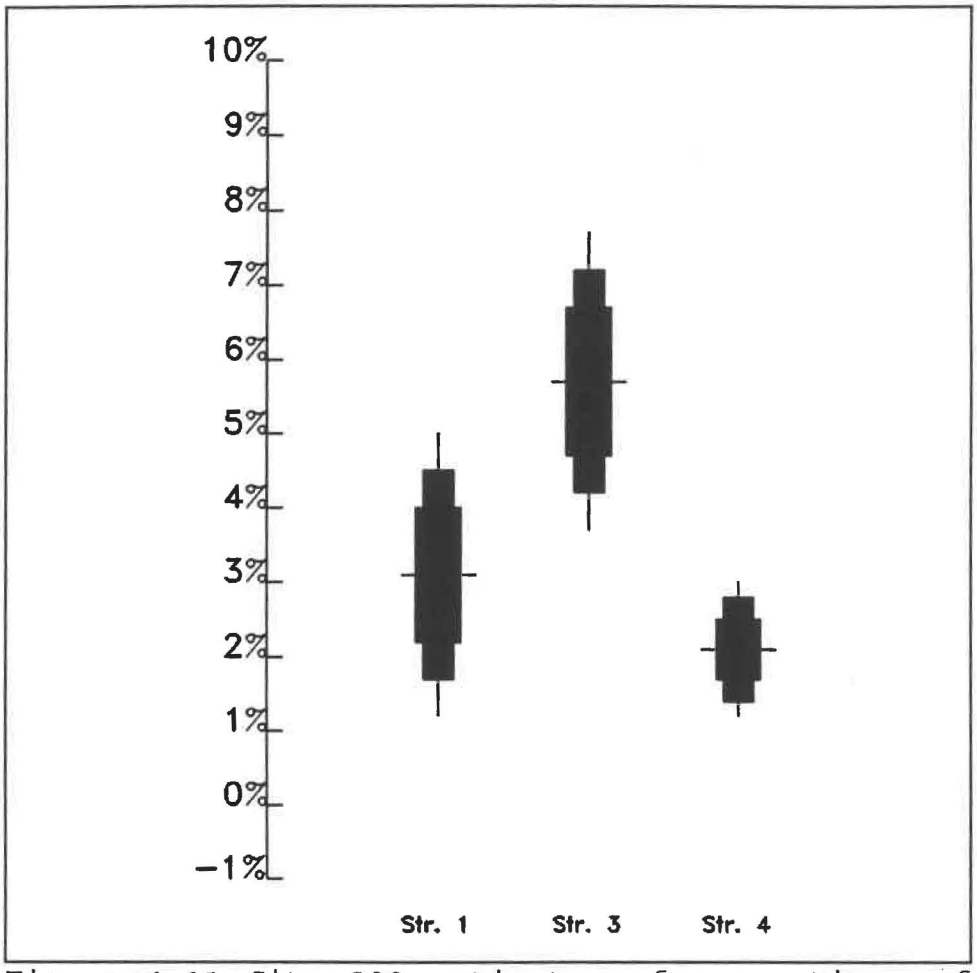


Figure 4.11 Site 288 estimates of proportions of imported and elaborately decorated sherds with error ranges for 80%, 95% and 99% confidence levels.

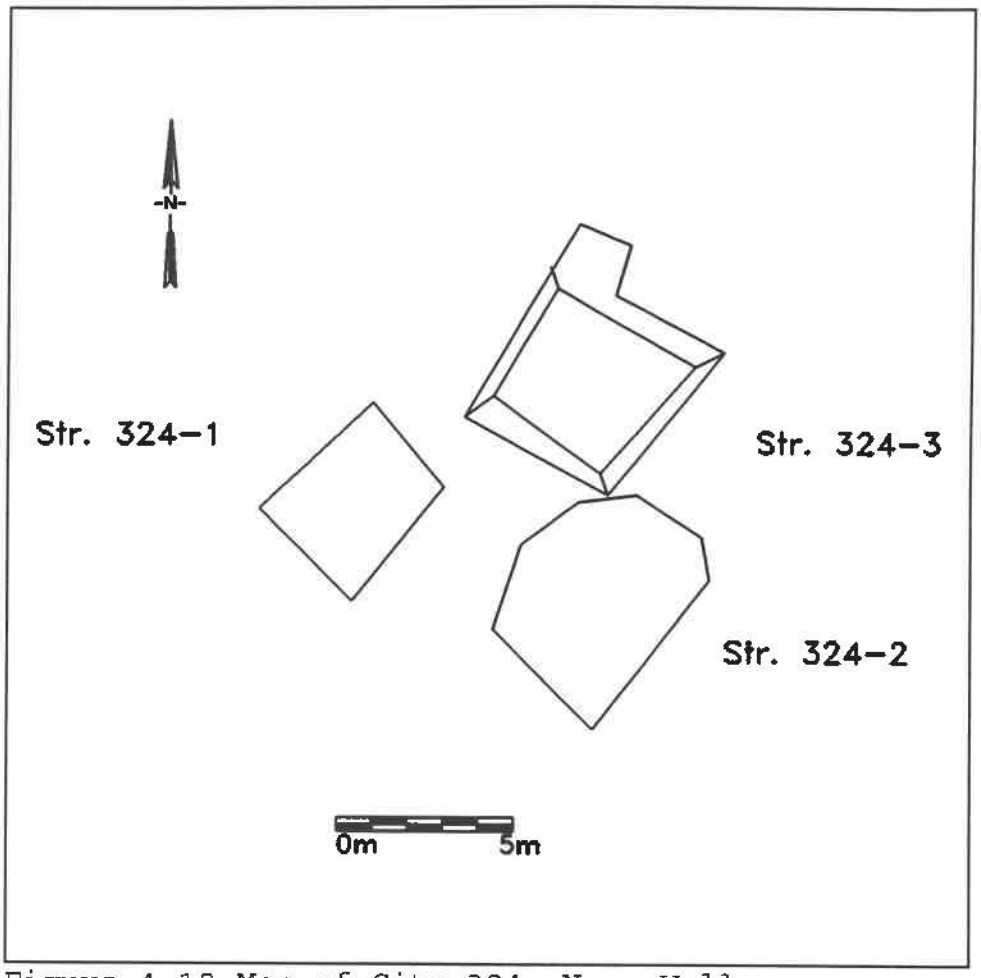


Figure 4.12 Map of Site 324, Naco Valley.

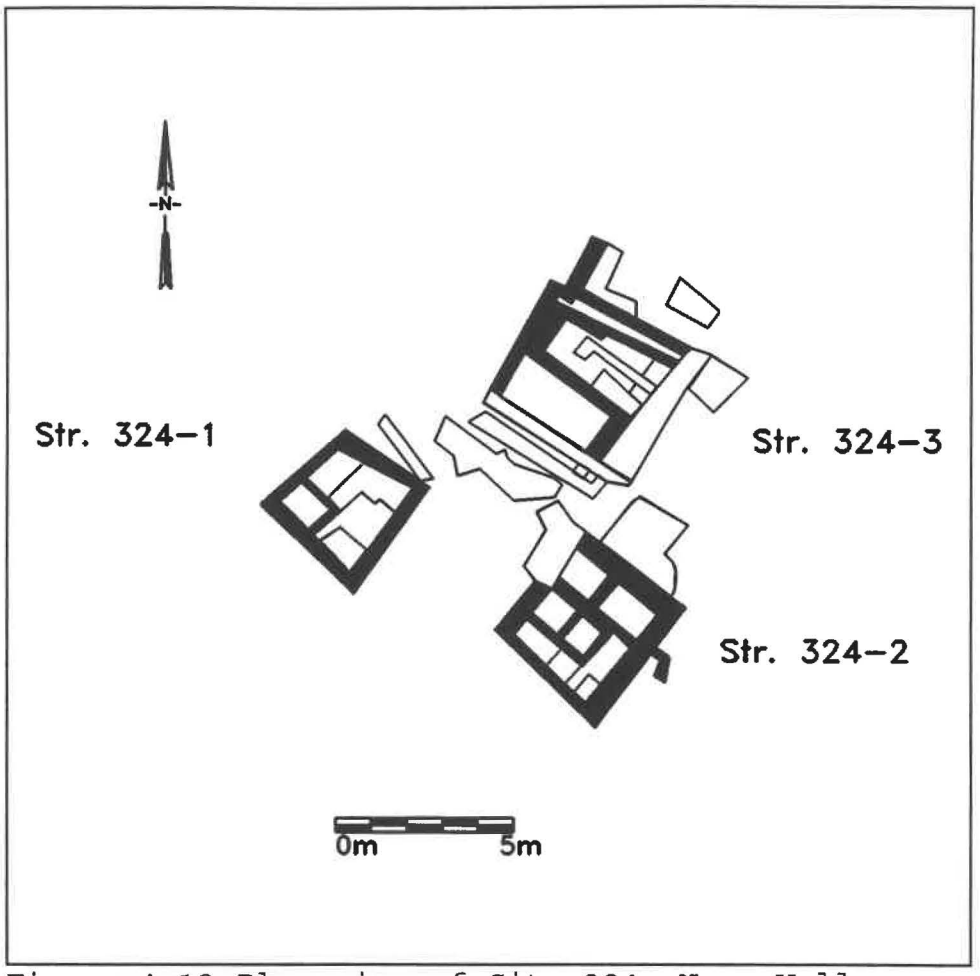


Figure 4.13 Plan view of Site 324, Naco Valley.

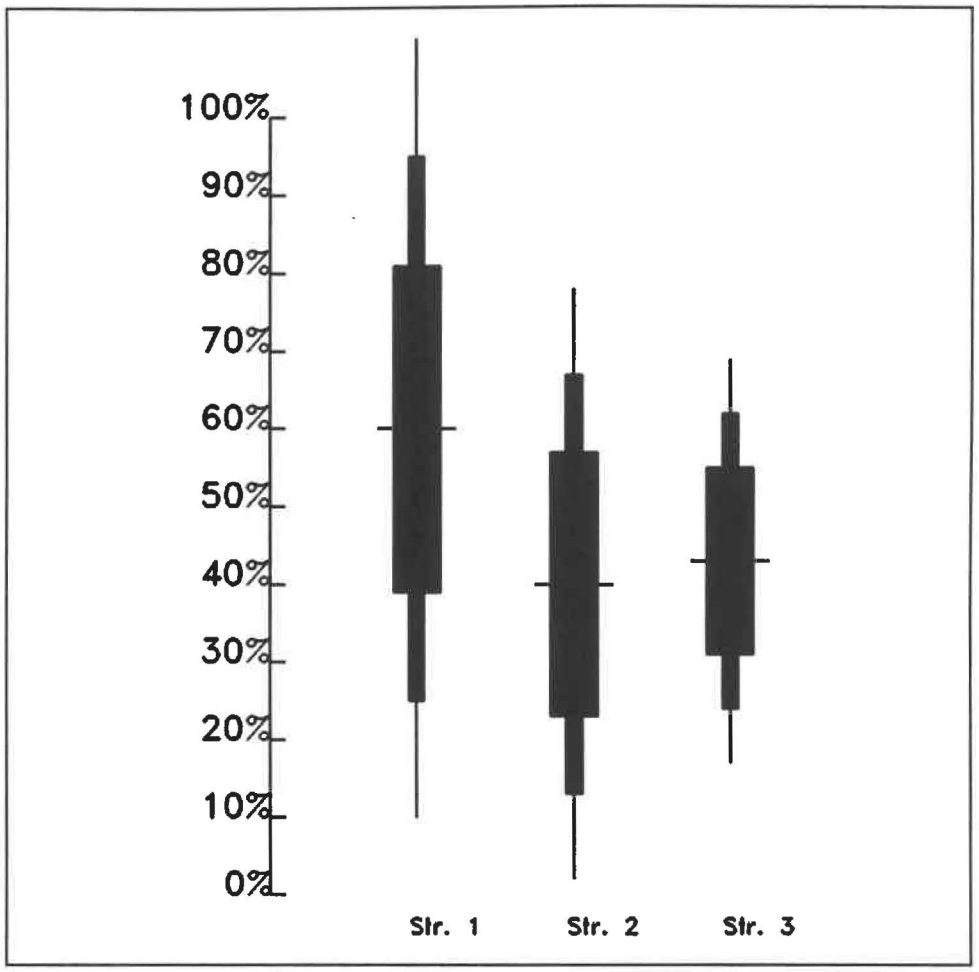


Figure 4.14 Site 324 estimates of proportions of bowl rim sherds per structure with error ranges for 80%, 95% and 99% confidence levels.

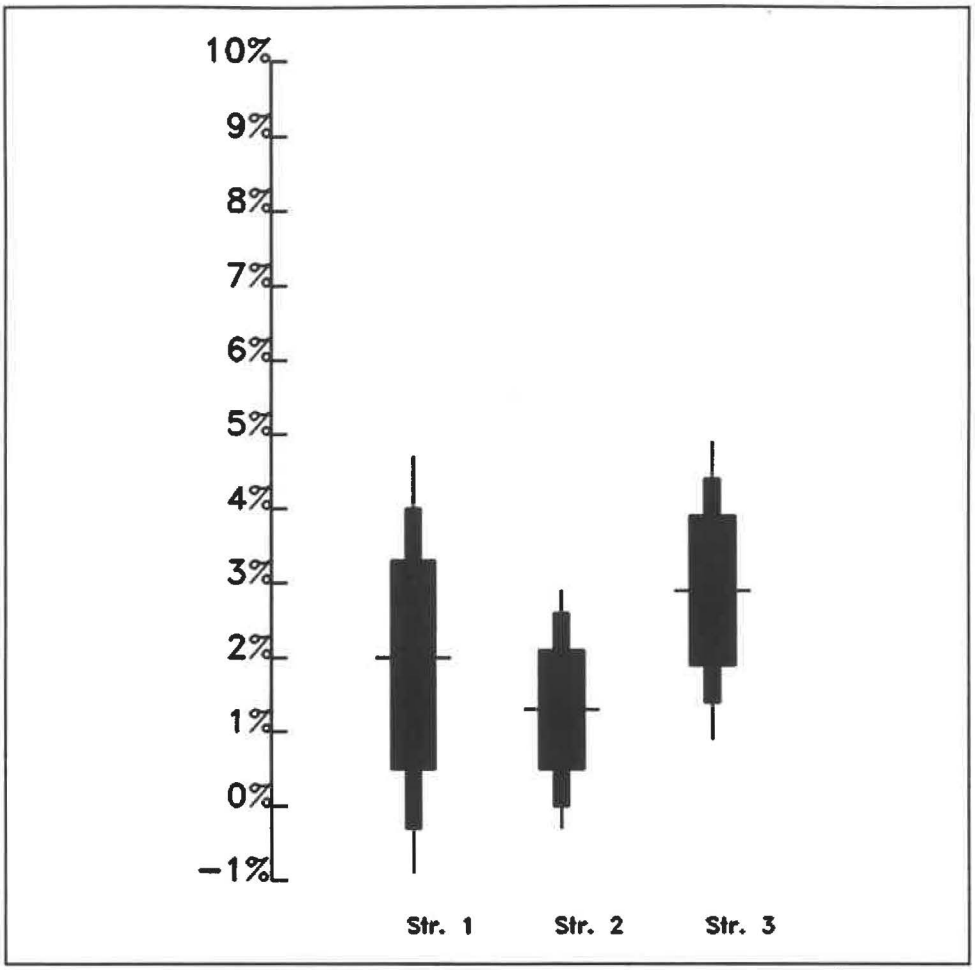


Figure 4.15 Site 324 Estimates of proportions of imported and elaborately decorated sherds per structure with error ranges for 80%, 95% and 99% confidence levels.

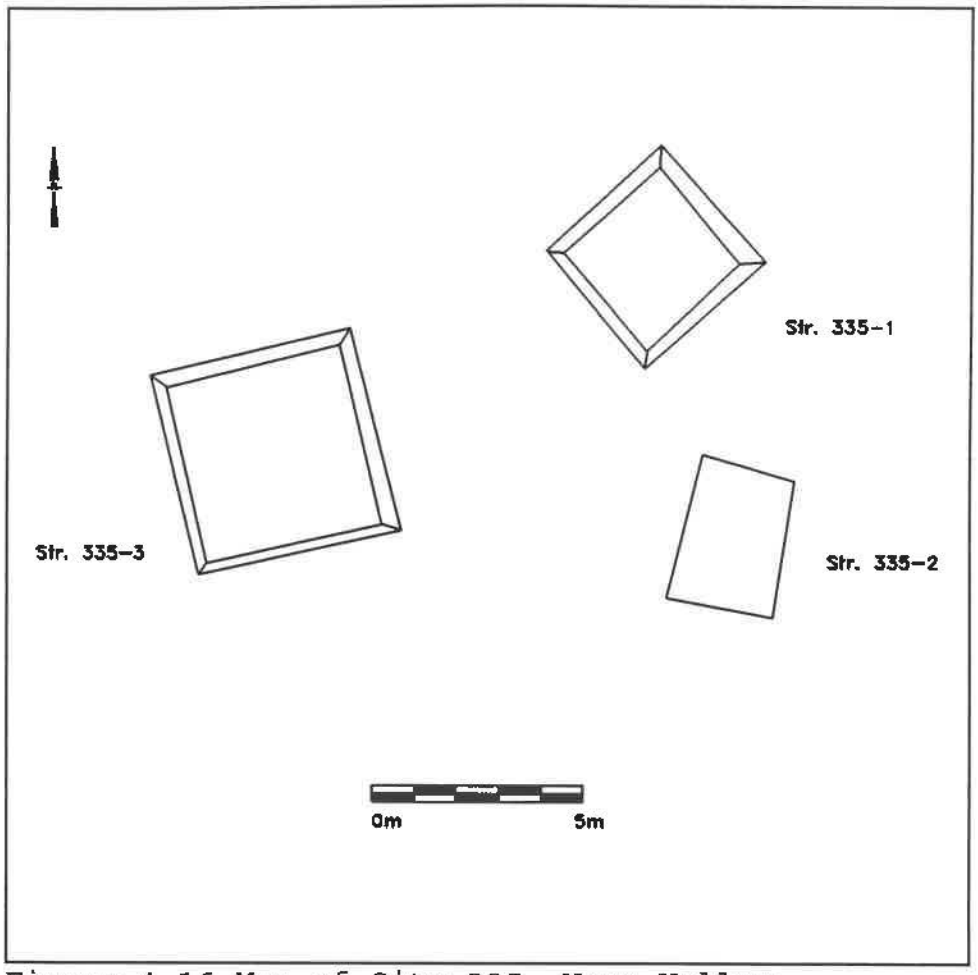


Figure 4.16 Map of Site 335, Naco Valley.

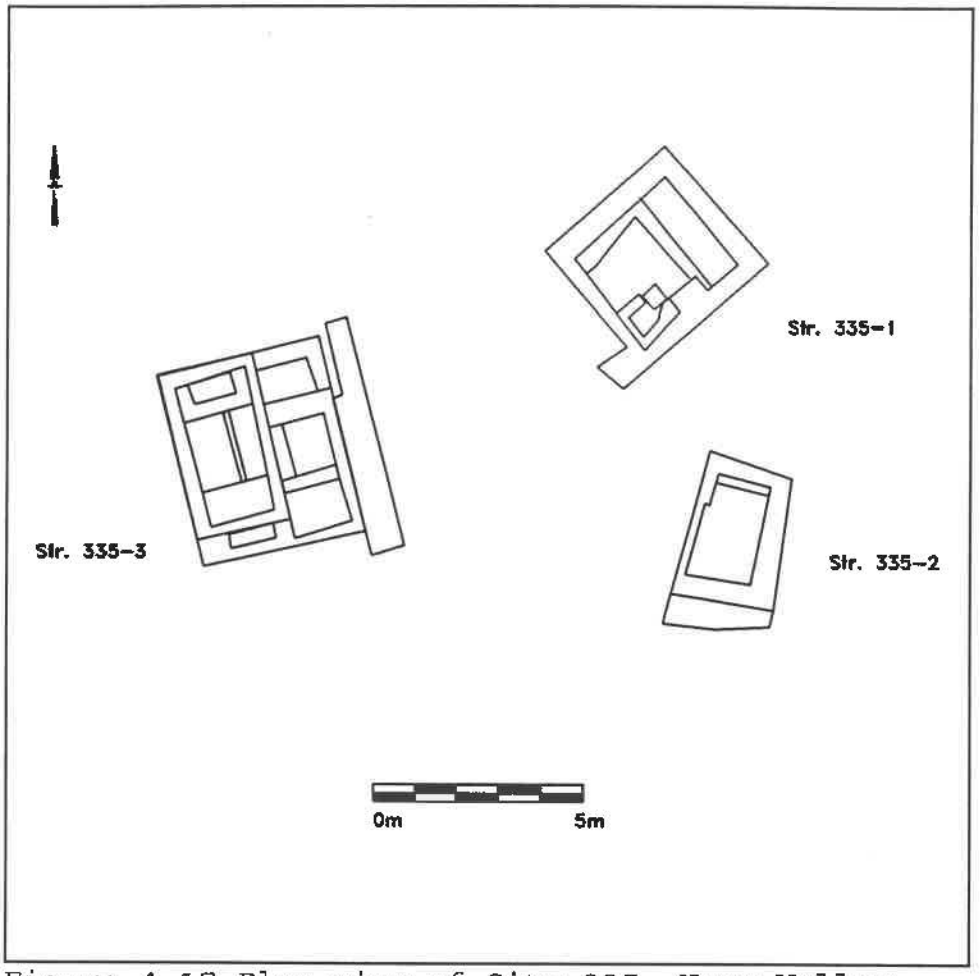


Figure 4.17 Plan view of Site 335, Naco Valley.

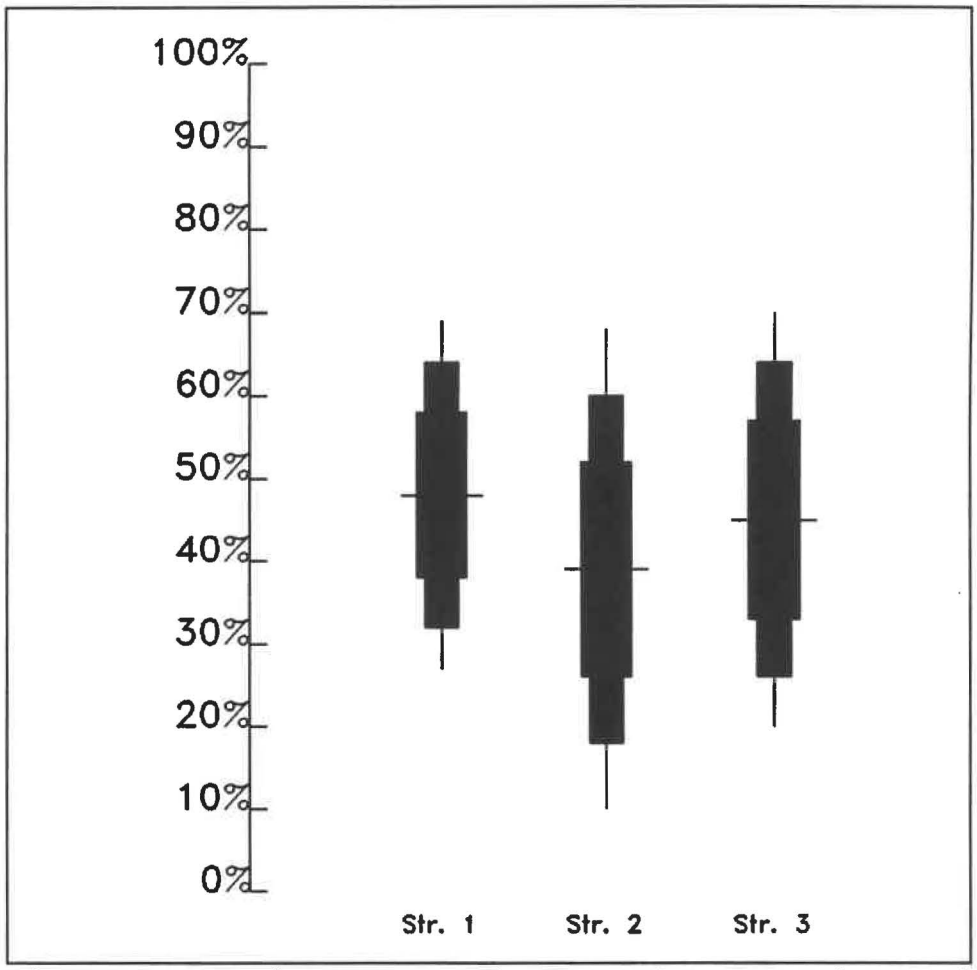


Figure 4.18 Site 335 estimates of proportions of bowl rim sherds per structure with error ranges for 80%, 95% and 99% confidence levels.

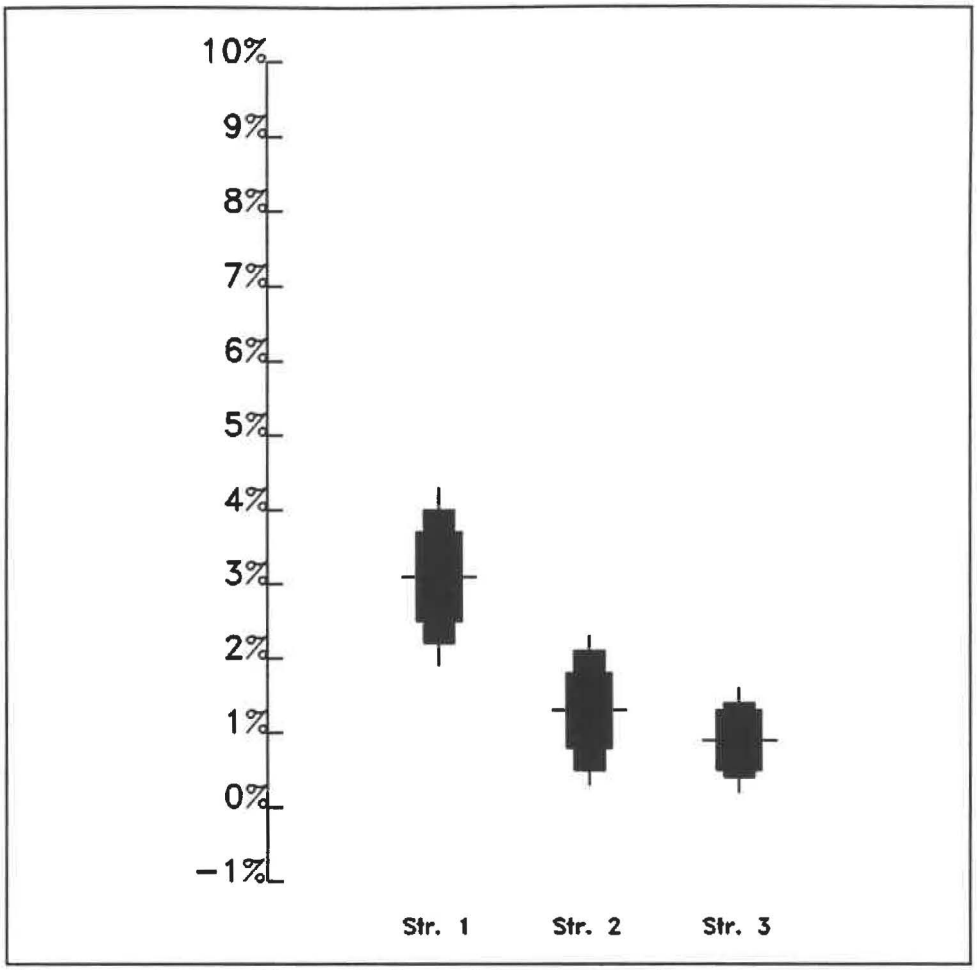


Figure 4.19 Site 335 estimates of proportions of imported and elaborately decorated sherds per structure with error ranges for 80%, 95% and 99% confidence levels.

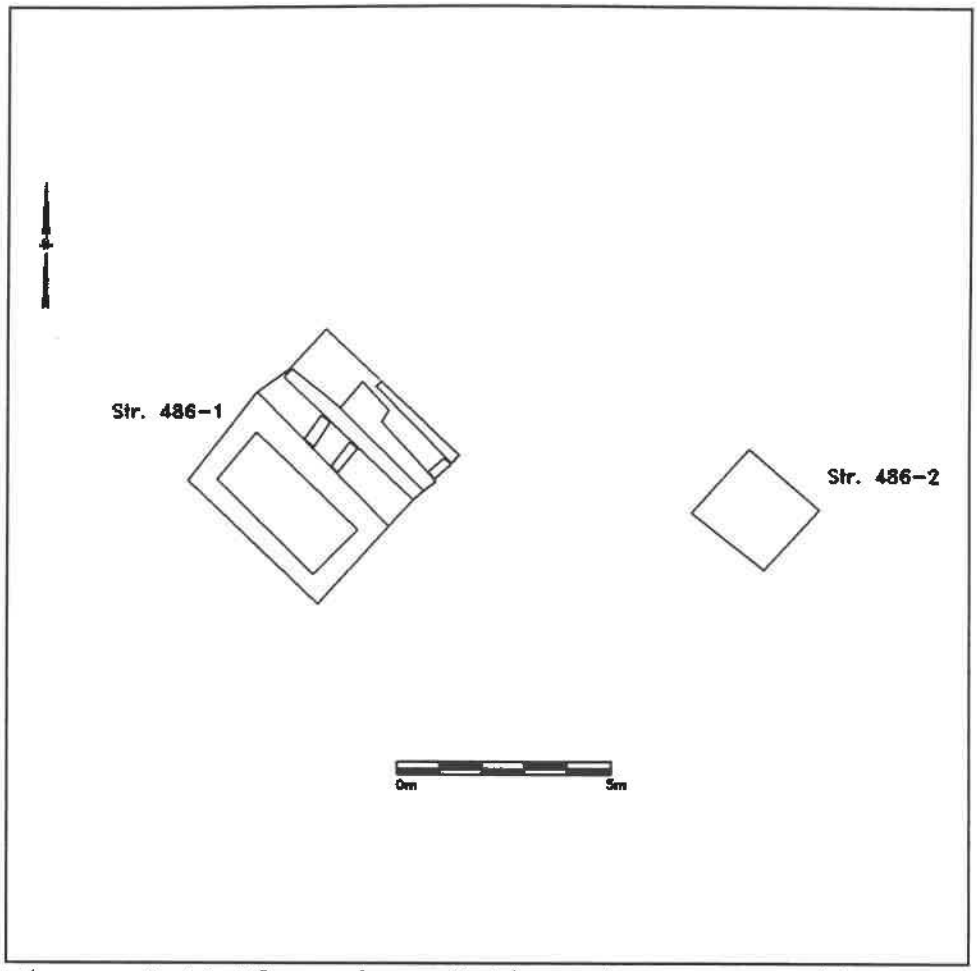


Figure 4.20 Plan view of Site 486, Naco Valley.

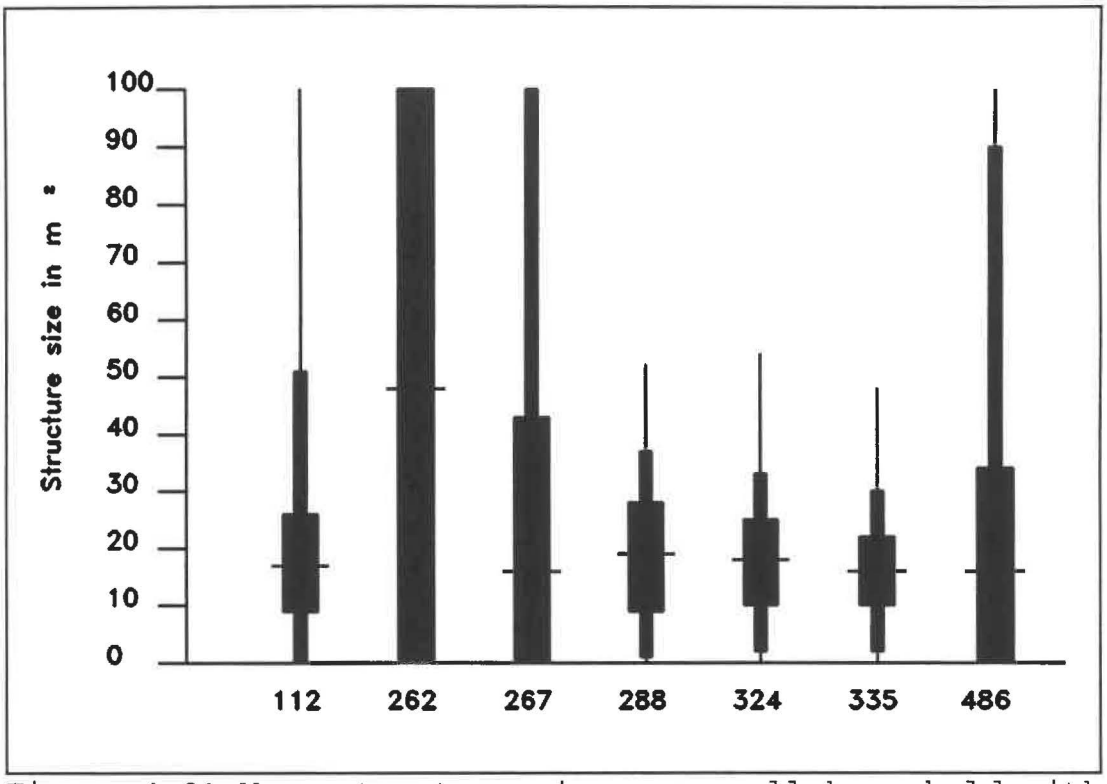


Figure 4.21 Mean structure size per small household with error ranges for 80%, 95% and 99% confidence levels.

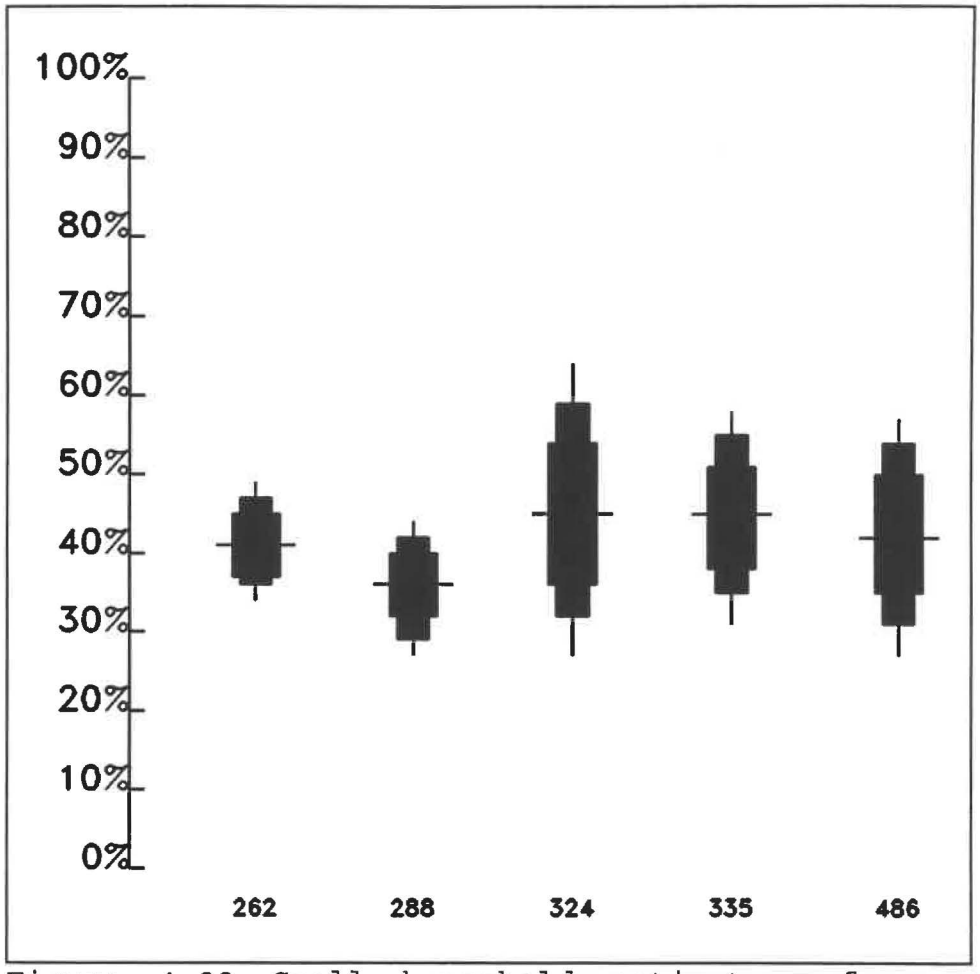


Figure 4.22 Small household estimates of mean proportions of bowl rim sherds per household with error ranges for 80%, 95% and 99% confidence levels.

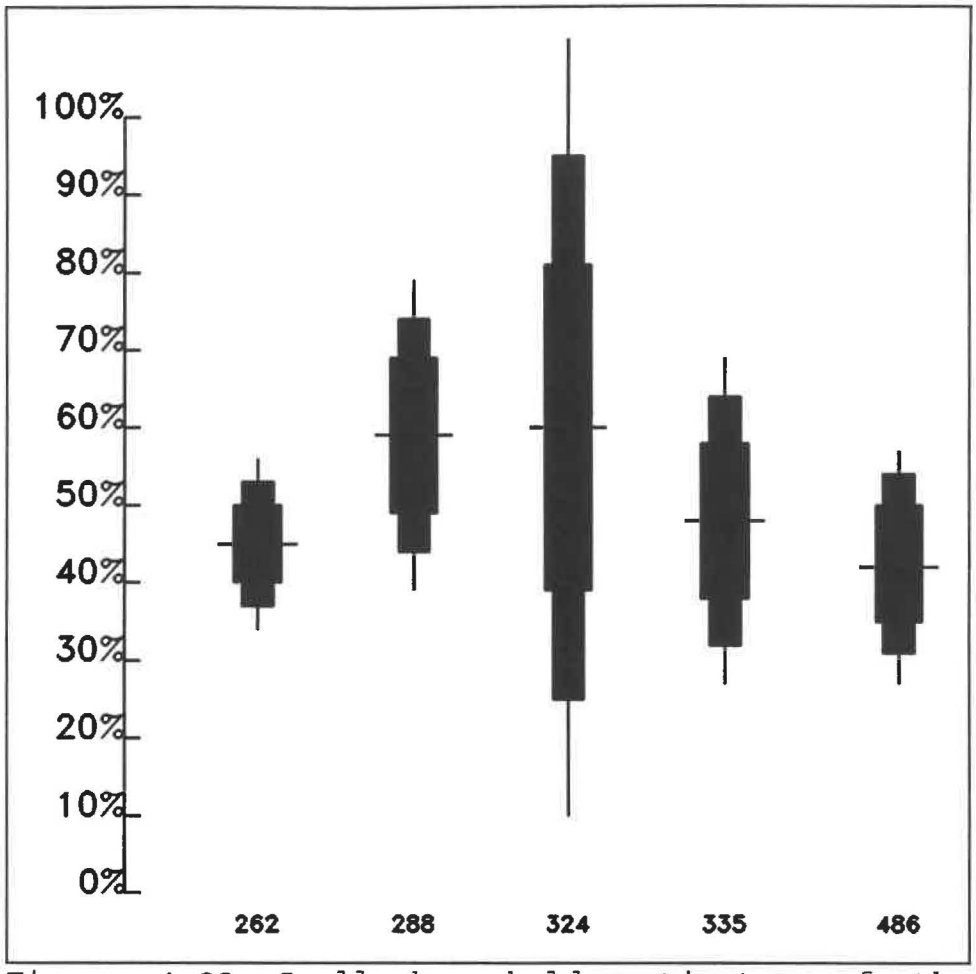


Figure 4.23 Small household estimates of the highest proportions of bowl rim sherds per household with error ranges for 80%, 95% and 99% confidence levels.

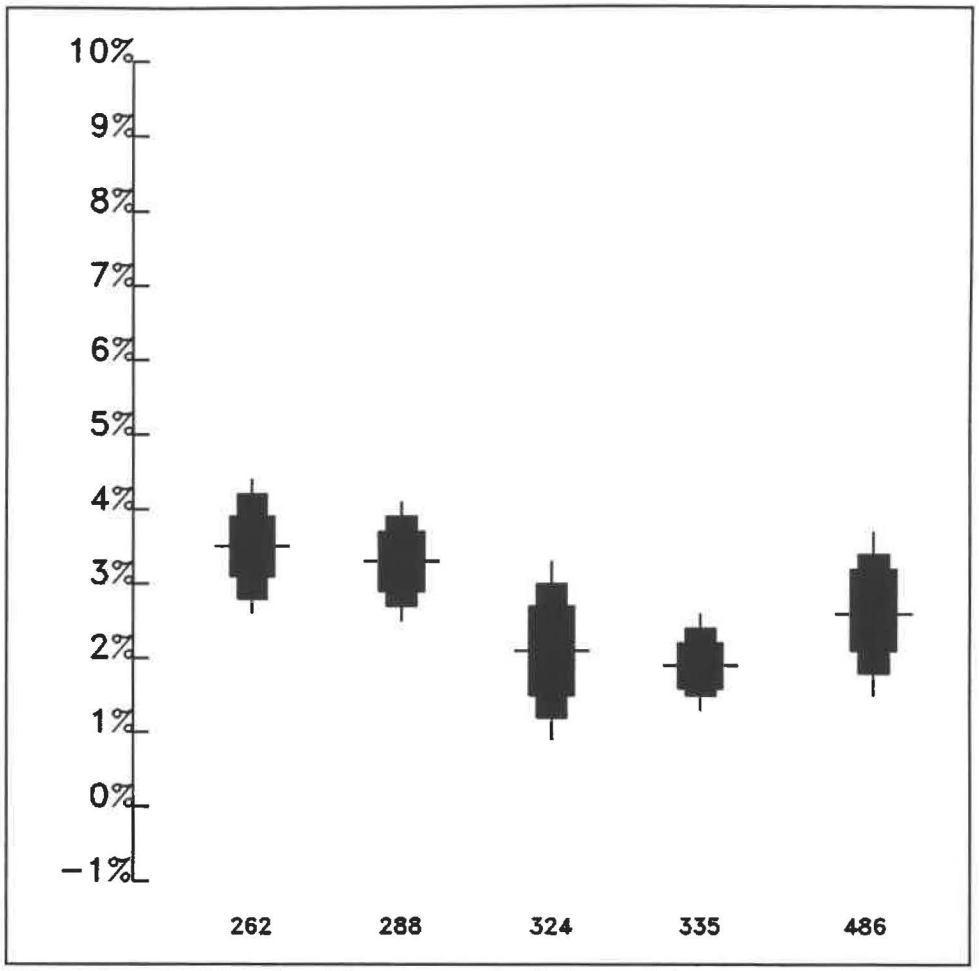


Figure 4.24 Small household estimates of mean proportions of imported and elaborately decorated sherds per household with error ranges for 80%, 95% and 99% confidence levels.

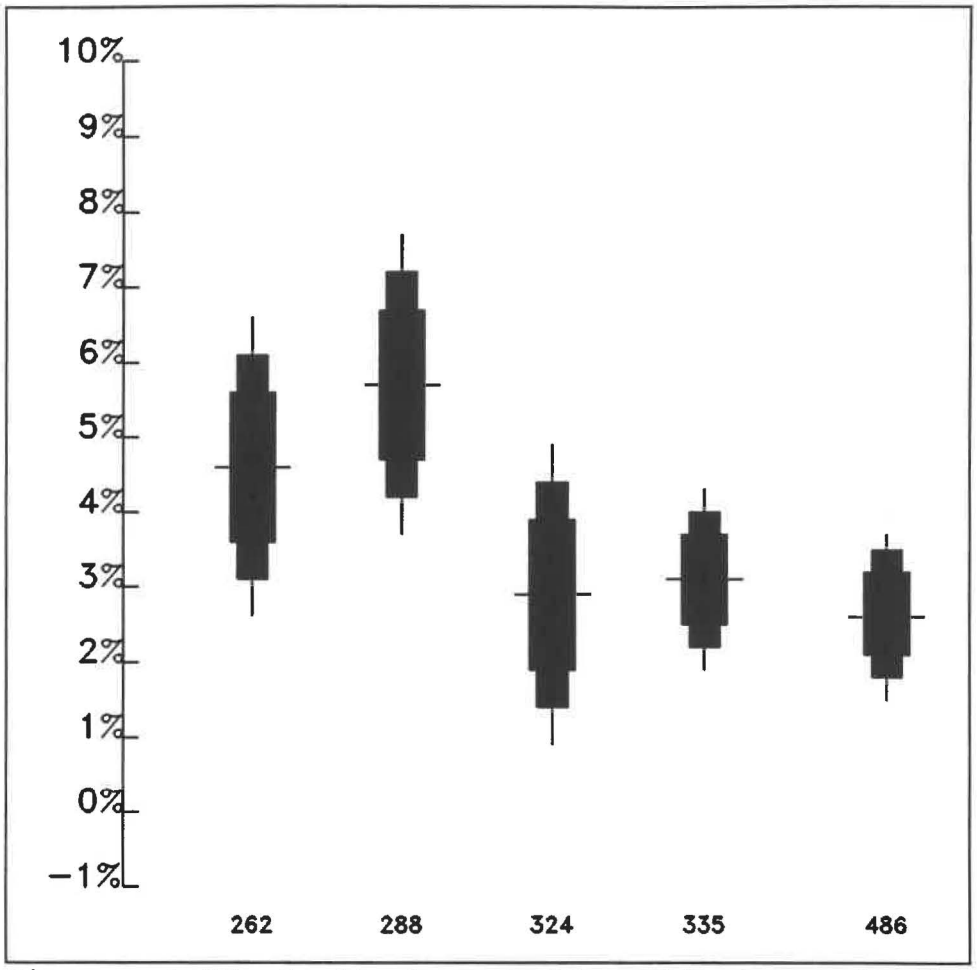


Figure 4.25 Small household estimates of the highest proportions of imported and elaborately decorated sherds per household with error ranges for 80%, 95% and 99% confidence levels.

CHAPTER FIVE

LARGE HOUSEHOLDS: ARCHITECTURE, ACTIVITIES AND WEALTH

Introduction

In the previous chapter, I examined small households in the Late Classic Naco Valley. Here, I investigate a sample of four large households located on each of the three broad classes of soils identified by Anderson (1994a). Site 120, with a total of 16 structures clustered around a central plaza, is located in the northwestern portion of the valley, on the third river terrace above the Río Manchaguala on Mollic Udifluvent soil (Class II), which has questionable fertility due to high salinity. Site 386, located as well in the northwestern portion of the valley, is on the Eutrudox soils (Class III), the least fertile soil class in the valley. This site is composed of four groups of structures organized in two large clusters of households, ca. 75 m apart. Finally, Site 485, in the western valley, is located on the Hapludoll/ Argiudoll soil class (Class I), which is characterized by good, fertile agricultural soil. This 17 structure household is composed of a single large cluster of structures with two smaller clusters located immediately adjacent to the principal patio group.

Site 120

Site 120 represents the remains of a large household. Located in the northern portion of the valley, ca. 0.2 km west

of the Río Manchaguala. Site 120 is in a narrow zone of Mollic Udifluvent (Class II) soils. In this 16-structure group, a total of seven buildings were partially cleared, of which six are discussed here (see Figures 5.1 and 5.2). Excavations were undertaken during the 1990 season by Susan Buchmueller (1991) and the author (Douglass 1991).

Structure 120-1 is one of the larger structures at the site, located on the northern edge of the central plaza. This platform originally had a basal area of 45.82 m^2, bounded by four tall (0.65 m high) walls enveloping fill. The summit, with an estimated area of 35.5 m^2, consisted of an earthen floor with a bench placed centrally in the single room. The bench divides the room into two general areas. During this and subsequent periods, formal access to the building was via a terrace on the patio (south) side. Later renovation of the platform minimally raised the northern portion of the summit an additional 0.5 m in height, earthen fill now burying the original bench. This elevating of the structure's summit, though not adding to its basal dimensions, did contribute significantly to its volume.

Structure 120-1 is interpreted, based on the large volume of the platform, as well as the central bench, as a residential structure. Limited amounts of craft production are associated with this platform, including possibly the decoration of cloth or paper through the use of the single stamp uncovered (see Table 5.1). The lack of mano and metate fragments and the presence of bowl and jar sherds indicate

that this structure primarily housed food consumption, rather than food preparation. Unfortunately, due to large error ranges, it is difficult to identify with high confidence distinctions in the proportions of bowl rim sherds per structure, as illustrated in Figure 5.3. However, it can be stated with very high confidence that the proportion of imported and elaborately decorated ceramics fall into two general groupings. Structures 120-1, 120-3 and 120-14 have similar proportions, which are significantly lower than the second group consisting of Structures 120-8, 120-10 and 120-13. While these differences may seem small (between 1% and 3% of all sherds recovered), they are significantly different and have great strength.

Structure 120-3, located along the northeastern margin of the plaza, immediately adjacent to the edge of the 3.5 m tall river terrace, originally consisted of an extensive platform constructed with a series of terraces on the east and west of the main summit. These terraces extend well beyond the actual summit and may relate to the sharp drop-off immediately to the east of the platform. This slightly elevated building contains an earthen floored summit originally consisting of a single, L-shaped room, measuring 4.41 m^2. Subsequently, renovation to the building added additional length to both the summit and surrounding terraces. A medial wall divided the summit during this subsequent period into two larger rooms, measuring 5.76 m^2 and 7.04 m^2. Beyond this medial wall, there are no additional permanent architectural features on the

superstructure.

The platform's open space and lack of built-in furniture suggest that Structure 120-3 functioned as an ancillary platform. The presence of bowl and jar sherds, metate fragments, figurine fragments and a single projectile point indicate this edifice supported multiple activities, including food preparation, consumption and storage of related items, including a projectile point most likely used in hunting. Wood cutting may also have been undertaken through the use of the single hacha.

Structure 120-8, located in the southeastern corner of the central patio, originally measured 25.9 m^2 and was ascended on the north by two small steps, while on the south the summit was reached via a series of four short, wide terraces. The summit, measuring in total 15.4 m^2, was divided into a series of three small rooms, measuring 3.23 m^2, 1.94 m^2 and 0.57 m^2. The smallest room is unusual at this location because of its size but is reminiscent of an enclosure noted on Structure 324-2. During a subsequent slight renovation of the building, a terrace on the western (patio side) edge of the building was extended, increasing the basal area to 31.82 m^2. Both basal and summit measurements are minimal measurements because the original eastern edge of the structure has eroded and fallen off the immediately adjacent river terrace.

Architectural evidence, including the small size of rooms and lack of built-in furniture, indicates that this platform

may have functioned as another ancillary structure. There appear to have been limited functions associated with this edifice beyond food preparation and consumption, as evidenced by the dearth of artifacts other than bowl and jar sherds. It is highly unusual for a structure in a household, except for field houses (see Sites 112 and 267), to contain no artifacts except sherds.

Structure 120-10 is located along the southwestern edge of the central patio, and originally measured 35.63 m^2. Constructed in a pattern similar to Structure 120-8, ascent to the summit on the south is *via* a series of six low, wide terraces, in contrast to only two terraces on the north. The summit, estimated to measure 12.15 m^2, is divided by a medially-placed bench. During a subsequent renovation of the edifice, the southern terraces were extended, enlarging the basal area to 52.87 m^2. On the north, a new, three-course-high wall was constructed, perhaps to aid in definition of the northern boundary of the summit.

The wide summit, containing a bench, and formal entrances on the north and south suggest that this platform served as a residence. The presence of bowl and jar sherds, a single *metate* fragment, figurine and censer fragments and a single stamp suggests that this structure sheltered diverse activities, including food preparation and consumption, ritual and decorating of paper or cloth.

Structure 120-13 is the largest structure at the site and occupies a notable location in the center of the northern

portion of the plaza. Originally constructed as a tall (1.22 m high) platform ascended *via* two terraces, it is estimated to have had a basal area of 44.75 m². Summit data for this initial construction is unknown. Later, during a renovation of the south side of the platform, a dedicatory human burial was placed in a new, third southern terrace that extended the basal area to an estimated 76.65 m². During a second renovation, the entire original platform was enveloped by a new and taller (2.05 m high) platform. Ascent to the summit was *via* eight terraces on the north and five on the south. During this final occupation of the building, the summit area encompassed 10.0 m² and was minimally divided into two separate spaces by a medial wall. As was seen in Structure 120-1, this final renovation of the platform did not significantly alter the basal area of the structure but did considerably augment the volume.

Structure 120-13, with its lone *metate* fragment and ceramic debris, is interpreted as a residence. The presence of bowl and jar sherds and a single *metate* fragment indicates that this edifice sheltered limited activities beyond the most basic domestic functions, including food preparation and consumption. As with Structure 120-8, there is a conspicuous lack of diversity in the household assemblage. This residence may have served special purposes in the household, based upon its central location in the group, its numerous and extensive renovations, and its dedicatory, secondary burial.

Structure 120-14, the final building to be discussed, was originally constructed as a platform rising 1.0 m high with a basal area of 8.28 m^2. The earthen floored summit is estimated to measure 6.6 m^2 and was divided, as exposed, by a single medial wall, creating two rooms. Access to the summit was only possible from the patio (eastern) side *via* a series of two short terraces.

Architectural elements, including the lack of permanent furniture, suggest that Structure 120-14 served as an ancillary structure. The presence of bowl and jar sherds, *candelero* fragments, and single examples of figurine and figurine mold fragments suggest this ancillary structure housed food consumption, ritual activity and limited craft production. Or alternatively, tools used to perform these activities were curated in this building. The low number of figurine fragments recovered at this site suggests that figurines, once made, may have been consumed elsewhere.

A discussion of the overall wealth of the household that occupied Site 120 is more complicated than many others analyzed in this study due to other, more discrete, indicators of wealth. For example, fragmentary remains of a small Ulua marble vessel were uncovered from Structure 120-3. The only example ever found in the Naco Valley, this vessel hails from the Sula plain, the next major drainage north of the Naco Valley. Ulua marble vessels were highly prized and scarce commodities during prehistory and are associated with high wealth or elite possession (Henderson 1992:164-6). They,

"represent the quintessential intuitively recognized elite marker: a considerable investment of effort was obviously involved in their production..." (Henderson 1992:164). However, the heavy erosion of the fragmented vessel may suggest that it had been a prized possession for quite some time, possibly generations.

In conclusion, it appears that the household at Site 120 had more diversity in house size and possession of valued items than many small households discussed in Chapter Four. At Site 120 there is a wide range in house size, from relatively small edifices like Structure 120-8 to extremely large domiciles like Structures 120-1 and 120-13. Possession of imported and elaborately decorated ceramics by household members appears to be divisible to two separate clusters, with those household members associated with Structures 120-8, 120-10 and 120-13 possessing significantly higher proportions. Large error ranges make clear distinctions difficult, but it appears that feasting activities may have been associated with Structure 120-8. Finally, those household members associated with Structure 120-3 possessed an extremely rare and costly item, an Ulua marble vessel.

Site 386, Groups II and IV

Site 386, Groups I to IV, represent the remains of two large, non-residential extended family households (see Figure 5.5). Located on the Eutrudox soil class (Class III), the agricultural fertility of the soil in the local area is poor.

This site is divided into four clusters of structures, each grouped around a central patio. In the general site, Groups I and II cluster ca. 15 m apart and Groups III and IV are located ca. 25 m apart. These two larger clusters are situated ca. 95 m from each other. This centralization may represent symbolically the close interaction, shared identity and cooperation within respective clumps (see Nutini 1968; Wilk 1984). As a result, Groups I and II and Groups III and IV, combined respectively, are viewed as non-residential, extended family households. All groups were investigated during the 1992 season under the supervision of Mathew Turek (Group I), Lyman Armstrong (1994) (Group II), the author (Group III and general field supervisor), and Jennifer Shearin and Chris Attarian (1993) (Group IV).

Site 386, Household #1 (Groups I and II)

Household #1 is investigated via the examination of Structures 386-6, -8, and -9, all located in Group II (see Figure 5.6). Structure 386-6 originally was constructed as a 0.30 m tall platform enclosing earthen fill, measuring basally 23 m^2. With a total summit area of 15.96 m^2, this surface was in many areas paved with river cobbles and divided into three rooms measuring 6.12 m^2, 1.44 m^2 and 2.52 m^2. While the northern two rooms were divided into two fairly small spaces, the southern portion of the summit was relatively open. Access was from the patio (north) side. During a subsequent renovation of the platform, the summit was further divided

into smaller cubicles. With the construction of a permanent bench, as well as more construction of walls, actual floor space in rooms measured 6.12 m^2, 1.44 m^2, 0.25 m^2 and 0.30 m^2. A riser was constructed on the northern side of the building to aid in gaining access to the building from both sides.

Architectural evidence, including a cobble paved floor, central bench and formal entrance, suggests this structure functioned as a residence. Bowl and jar sherds, metate fragments, ocarina, figurine and censer fragments and single examples of stamps and figurine molds imply that this edifice sheltered a range of domestic activities, from food processing and consumption and ritual activity to craft production, including fabric or cloth decoration and figurine manufacture (see Table 5.2). Unfortunately, ceramic analysis for all structures is not available for Group II.

Structure 386-8, like Structure 386-6, was originally constructed as a platform, rising 0.40 m and measuring in basal area 19.80 m^2. The summit, originally measuring 10.78 m^2, was divided into two equal-sized rooms, measuring 4.86 m^2 and 5.92 m^2. However, the subsequent renovation added new dividing walls that created a total of five summit rooms out of the original two, measuring 2.28 m^2, 2.4 m^2, 3.04 m^2, 0.65 m^2 and 0.85 m^2. These smaller rooms are reminiscent of those observed at Structures 120-8 and 324-2. There is no evidence of a formal entrance.

The lack of permanent furniture on the summit indicates the platform's use as an ancillary structure. At a practical

level, the relatively small rooms would not have allowed people to stretch out to sleep. Multiple activities are associated with this platform, including food processing and consumption, ritual, and decoration of cloth or paper, as evidenced by the presence of bowl and jar sherds, mano and metate fragments, ocarina, figurine and censer fragments, and two stamp fragments.

Structure 386-9 construction is similar to its nearest neighbors. Measuring basally 11.84 m^2, this platform is delimited by low outer walls holding in an earthen fill. The summit during the initial period of occupation was divided by a medial wall into two rooms. However, subsequent renovation reduced these two relatively large enclosures into four smaller rooms, measuring 1.23 m^2, 1.69 m^2, 0.94 m^2 and 1.06 m^2. No evidence of built-in furniture or a formal entrance was evident during excavation.

As with Structure 386-8, this edifice may have functioned as an ancillary structure, based on the lack of built-in furniture and the small size of rooms. Activities performed in association with this edifice were similar to those attested to at the other two buildings under investigation, including food processing and consumption, ritual and cloth or textile decoration, as evidenced by the presence of bowl and jar fragments, a single metate fragment, figurine and censer fragments and a single stamp fragment. The differences in the distribution of stamps and figurines is somewhat significant and indicates that Structure 386-9 may have been a focus for

activities associated with these artifacts (or a place where they were stored in some numbers) (stamps: chi-square=3.31, df=2, 0.2>p>0.1; figurines: chi-square=4.2, df=2, 0.2>p>0.1).

It is unusual in the sample of small and large households to observe virtually identical activities performed in all structures of a household as is the case here. Any observed differences in the distribution of metates (chi-square=0.97, df=2, p<0.5), ocarinas (chi-square=0.74, df=2, p<0.5) and censers (chi-square=2.54, df=2, 0.5>p>0.2) are not very significant. With the exception of a single figurine mold uncovered in association with Structure 386-6, similar tasks are present in all structures. This may relate to increased cooperation of individual families in the household. The two types of activities related to craft production, decoration of paper or textiles and figurine manufacture, appear to be undertaken on an independent, part-time basis due to the low numbers of fragments recovered.

The household at Site 120 indicated substantial differences between household members in house size and wealth items, such as elaborately decorated and imported ceramics. There, it appeared that some household members were significantly wealthier than others. At Site 386, Household #1, there appears to be a much more even division of wealth. House sizes are similar. Ceramic analysis is not available for this locale. However, the artifact assemblage shows that all household members engaged in similar activities at comparable

levels. Therefore, this large household contrasts with Site 120 in the organization of labor and distribution of wealth.

Site 386, Household #2 (Groups III and IV)

Group IV is evaluated through studies of Structures 386-13 and -14, located on the northeastern edge of Group IV's patio, adjacent to Structure 324-24, the household's largest structure (see Figure 5.7). While originally constructed some 7.0 m apart from one another, through time Structures 386-13 and -14 were connected via a series of ancillary rooms.

Structure 386-13 originally was a small, square platform measuring 11.1 m^2. Summit space, covering 4.83 m^2, was segmented by an "L" shaped bench into two segments measuring 1.19 m^2 and 2.55 m^2. During this initial construction period a single platform was placed between Structures 386-13 and -14. Measuring 14.08 m^2, the summit encompasses 7.8 m^2.

Structure 386-14 was originally divided into six rooms measuring in area 2.8 m^2, 3.96 m^2, 4.96 m^2, 2.24 m^2, 2.09 m^2 and 3.36 m^2. With a basal area of 46.9 m^2, Structure 386-14 was much larger during its initial construction than Structure 386-13.

Through time, the divisions between Structures 386-13 and -14 became increasingly artificial. Construction in the space that initially separated the structures was filled with three new ancillary rooms, measuring 6.9 m^2, 5.8 m^2 and 4.6 m^2. While the original rooms on Structures 386-13 and -14 were well defined with interior and exterior walls, these new

additions are formed in the former patio between the two structures. At the end of construction, these buildings contained a total of twelve rooms and covered a total of 95.26 m^2, including both Structures 386-13, 386-14 and 386-13/14.

While Structure 386-13 functioned as a residence, and Structures 386-14 and 386-13/14 both appear to be ancillary structures, similar types of activities were pursued in all three loci, including food processing and consumption (including hunting), ritual, ground stone and figurine manufacture, and wood working (see Table 5.3). This may indicate equal access and cooperative behavior among household members, a pattern also seen in Site 386, Household #1. However, certain types of activities appear to be more heavily concentrated in one area or another. The differences in the distribution of ocarina fragments, for example, are very significant (chi-square=7.33, df=2, $0.05>p>0.02$). Here, Structure 386-14 contains nearly double the expected number of ocarina fragments. The differences in the distribution of censer fragments is highly significant, with Structure 386-13 containing roughly 60% more than expected (chi-square=7.61, df=2, $0.05>p>0.02$). The low frequency of artifacts associated with all types of craft production activities indicates only independent, part-time production. While there are numerous different activities being undertaken in these three areas, I would hesitate to call this a workshop; the concentration of production is similar to that at other households.

Site 485

Site 485 represents the remains of a large household. Located ca. 1.5 km south of the Río Naco, Site 485 is found on Hapludoll/Argiudoll soils (Class I), fertile agricultural land. The site occupies terrain that gently slopes down from west to east and is located close to the border with the metamorphic foothills to the west. Originally surveyed by the author and Edward Schortman early in the 1996 season, it was excavated later that season under the supervision of the author. A total of fifteen above-ground and two buried structures were mapped, of which three were tested and extensively cleared (see Figure 5.10).

Structure 485-3 is located on the southern edge of the site's primary patio. The original platform rises ca. 1.15 m above the ground surface and measures 52.8 m². The summit was divided into three rooms by stone bases for wattle and daub walls. These enclosures cover 7.2 m², 7.56 m² and 3.2 m². In addition, an "L" shaped bench was placed centrally in the summit. The summit was ascended on the east via two wide terraces. Immediately to the north of the platform is a patio paved with a combination of schist and cobbles that extends, minimally, the width of the edifice.

Subsequent renovations altered the use of interior summit space but did not affect Structure 485-3's basal dimensions. Through the construction of several walls and a low, wide shelf, the summit during this later construction phase contains a total of four rooms, measuring 1.25 m², 6.75 m²,

3.0 m² and 5.25 m². The overall size of summit rooms during this period shrank considerably from the previous period due to the construction of more permanent furniture and subdivision of existing space.

This tall, wide platform, based on architectural elements that include a central bench and relatively large rooms, is interpreted as a residence. The recovery of bowl and jar sherds, a single mano fragment, candelero, ocarina, figurine and censer fragments, a figurine mold and two gravers suggest that this residence housed a wide range of activities, including food preparation and consumption, ritual, figurine manufacture and woodworking (see Table 5.4). It appears that the residents of this platform had restricted access to items of personal adornment, including a pendant and earspool, that may be indicative of their elevated material status. There is some indication that Structure 485-3 may have been a locus for ritual activity. The difference in the distribution of censer fragments between household members is somewhat significant (chi-square=3.98, df=2, $0.2>p>0.1$), with censer fragments higher than expected at this location.

Structure 485-7, constructed on a low, natural rise located in the northern portion of the primary patio group, measures 53.2 m². Access from the patio to the summit was by two wide terraces cut into the gentle natural slope. Unlike Structure 485-3, a platform, this edifice was built at ground level, atop a natural elevation. Interior space, in its original form, measured 17.6 m² and was a relatively open

space, with a single long, narrow bench positioned in the southern portion. The room's floor was completely paved with schist. At a later time, renovation occurred on the structure, altering the building's interior. In addition to replacing the schist paved floor with another floor placed on top of the original, a second bench was placed in the northeastern corner. Finally, some time later, a third schist floor was laid down, creating a bi-level floor, the western half at the height of the top of the original bench, obscuring the bench.

This edifice is thought to have functioned as a residence based upon the presence of multiple benches, open space and paved floor. The presence of bowl and jar sherds, mano and metate fragments, and ocarina, figurine and censer fragments indicate that food preparation and consumption and ritual activity were undertaken at this location. There is no evidence of craft production. The differences in the distribution of ocarina fragments is highly significant (chi-square=10.04, df=2, $0.01>p>0.001$). Ocarina fragments at this location are nearly four times more numerous than expected.

Structure 485-10, located on the southwestern edge of the household, is part of a small, secondary cluster of structures ca. 7 m southwest of the principal cluster. Prior to the construction of Structure 485-10, occupation at this location is evidenced by a midden deposit and two enigmatic lines of stone. Later, the construction of the original ground-level building was undertaken. Consisting of four outer walls, it measured 30.15 m^2 and had an interior space of 10.0 m^2, the

result of thick walls. A lone shelf was the only permanent furniture. Later, this interior space was filled with earth to the top of the outer walls, creating an open, elevated platform with an earthen floor measuring 30.15 m^2. There is no evidence of architectural features associated with the summit.

Architectural evidence suggests that this platform functioned as an ancillary structure, based on the summit's open space and lack of permanent furniture. Bowl and jar sherds, mano and metate fragments, candelero, figurine and censer fragments, and a single sherd disk suggest that this platform was associated with food preparation and consumption, ritual activity, possible ceramic manufacture and storage of goods, including a crude sculpture of a human skull created from locally available volcanic tuff. It is unclear if the sculpture was produced in the household or elsewhere in the valley. There is scant evidence of craft production associated with Structure 485-10 beyond a single sherd disk, possibly used in the production of ceramics. However, no other evidence supports this interpretation.

In sum, the household remains of Site 485 suggest that there were differences in the distribution of activities and wealth from one structure to another. Residents of Structure 485-3, a dominant ediface in the primary patio, appear to have engaged in diverse types of activities, including figurine manufacture and wood working. While the error range for Structure 485-7 is large, the proportion of imported and elaborately decoratedly ceramics from Structure 485-3 is

significantly higher than the proportion from Structure 485-10 (see Figure 5.12). There appear to be no significant differences in the proportion of bowl rim sherds between structures (see Figure 5.11). The presence of personal items of adornment in Structure 485-3 also lends support to the interpretation that its inhabitants had an elevated position in the household.

Differences in house size, proportions of imported and elaborately decorated ceramics and bowl rim sherds among household members at Site 485 are greater than observed at many small households discussed in Chapter Three. House size appears to vary considerably at the site, with houses on the margins of the original patio group appearing to be smaller. Varying proportions of imported and elaborately decorated ceramics among the three excavated structures suggest that the proportion from Structure 485-3 is significantly higher than that found on and around Structure 485-10 and may be similar to the figures for Structure 485-7. While large error ranges preclude high confidence, it appears that Structure 485-7 may have been a locale for feasting, based upon its relatively high proportion of bowl rim sherds. In sum, there appears to be a fairly high degree of diversity in house size, wealth and feasting among household members at Site 485.

Comparisons of Large Households: Architecture, Activities and Wealth

Large households appear to be more diverse architecturally than small households on several fronts.

First, while any observed differences between residential and ancillary structures among small households appear to be due to the vagaries of sampling, in large households residences are larger, with a mean difference of 8.84 m^2. This difference is highly significant (T=2.602, p=0.041). However, the strength of this difference is debatable. Certainly, this pattern suggests that large households invested more labor in their residences. But, the amount of labor required to construct even relatively large bajareque residences may not be more than several person/days more than what was needed to raise their counterparts in small households.

There is a 10.16 m^2 difference in mean overall structure size between large and small households when using survey data. This difference, indicating that large households have larger structures, is very significant (T=2.3, p=0.032), a finding that suggests that larger households contained a higher number of residents per structure (i.e. bigger family size). Certainly, this implies that large households had greater access to labor, for creating more expansive structures, than did small households.

Mean structure size among large households is more varied than among small households. As illustrated in Figure 5.13, the mean structure size among large households appears to be in three groups, with Site 386, Group II at the bottom and the household at Site 120 at the top. Because of Site 386, Group IV's large error range, it is difficult to state with high confidence that its mean structure size is significantly

higher than the low-end cluster. The mean structure size at Site 120 is significantly larger than the other three households. These differences in mean structure size between large structures are very significant (F=4.707, p=0.006).

As noted in Chapter Three, the diversity in household structure size is similarly important. Households at Sites 120, 386 Group IV and 485 all appear to have much more diversity in household size than do small households, with the exception of Site 262 (see Figure 5.14). This diversity implies that there may be differences among household members at these locations that are not present elsewhere. While Site 386 Household #1 is an exception, it appears that larger households tend to be more internally diverse in access to labor and wealth items than do small households.

There are no significant differences in the distribution of other types of ground stone, but the household at Site 386, Group II appears to have concentrated on behaviors involving the use of metates, evidenced by nearly three times the expected proportion. Differences in the distribution of metates among large households are very significant (chi-square=9.64, df=3, 0.05>p>0.02).

Ritual activity, as evidenced by ocarina and figurine fragments, appears to be clustered at the household at Site 386, Group II. Both types of artifacts are present in roughly double the expected proportions. The differences in the distribution of ocarina and figurine fragments are highly significant (ocarina:chi-square=12.03, df=3, 0.01>p>0.001;

figurine:chi-square=14.09, df=3, 0.01>p>0.001). Among large households, the household at Site 386, Group IV appears to be the only household in which censers were intensively used. Censer use at Site 120 is very rare. These differences among large households are highly significant (chi-square=18.25, df=3, p>0.001).

Only a single activity appears to be exclusively undertaken by all large households: figurine manufacture through the use of molds. While the Site 324 household had a significantly high frequency of figurine fragments, there was no evidence of figurine production. While only large households use molds in the production of figurines, there does not appear to be any significant concentration of figurine production (chi-square=0.91, df=3,p<0.5).

The estimated mean proportion of imported and elaborately decorated sherds per large household indicates that there is high confidence that all three came from distinctly different populations (see Figure 5.15). While there is less confidence that the estimated mean proportions from Sites 120 and 386, Group IV are significantly different, the estimated mean proportion from the household at Site 485 is significantly higher than either of the others.

Comparison of small and large household estimated mean proportions of imported and elaborately decorated sherds indicates that there is similarity between the different households, with a gradation from high estimated mean proportions to low. Certainly, those estimated mean

proportions from the households at Sites 262, 288 and 485 are similar. However, these estimated mean proportions are significantly lower than those from households at Sites 324, 335 and 120. It is more difficult to state the exact relationship of either Sites 486 or 386, Group IV to other households. Any observed differences between small and large households as groups most likely are due to the vagaries of sampling ($T=0.536$, $p=0.602$).

Analysis of estimated confidence levels of large household mean bowl rim sherd proportions per household indicate that, like imported and elaborately decorated ceramics, there is a gradation from high to low proportions (see Figure 5.17). The estimated mean proportion from Site 120 is significantly higher than that recovered from Site 485. It is more difficult to state clearly the relationship between Site 386, Group IV to either Sites 120 or 485.

Analysis of the differences in the estimated mean proportion of bowl rim sherds between small and large households is not clearly understood. The estimated mean proportion from the household at Site 120 is significantly higher than any other household, either small or large. The estimated mean proportions from Sites 386, Group IV and 485 appear to be similar to those from Sites 324, 335 and 486. Any observed differences between the estimated mean proportion of bowl rim sherds from small or large households as groups are most likely due to the vagaries of sampling ($T=1.423$, $p=0.180$).

Table 5.1. Site 120 Household Assemblage

Artifact Category	Str. 1		Str. 3		Str. 8		Str. 10		Str. 13		Str. 14		Total	
Mano fragment	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Mano roughout	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Metate fragment	0	(0.00)	2	(0.14)	0	(0.00)	1	(0.15)	1	(0.15)	0	(0.00)	4	(0.05)
Metate roughout	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Candelero fragment	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	2	(0.06)	2	(0.02)
Ocarina fragment	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	1	(0.03)	1	(0.01)
Stamp fragment	1	(0.09)	0	(0.00)	0	(0.00)	1	(0.15)	0	(0.00)	1	(0.03)	3	(0.04)
Figurine fragment	0	(0.00)	3	(0.20)	0	(0.00)	1	(0.15)	0	(0.00)	1	(0.03)	5	(0.06)
Figurine mold	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	1	(0.03)	1	(0.01)
Polishing stone	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Pigment stone	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Hacha	0	(0.00)	1	(0.07)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	1	(0.01)
Hacha blank	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Barkbeater	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Censer fragment	0	(0.00)	0	(0.00)	0	(0.00)	1	(0.15)	0	(0.00)	0	(0.00)	1	(0.01)
Sherd disk	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Pendant	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Earspool	0	(0.00)	1	(0.07)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	1	(0.01)
Sculpture	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Drill/borer	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Graver	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Projectile point	0	(0.00)	1	(0.07)	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)	1	(0.01)
Sherds	1106		1467		817		662		643		3466		8161	

Note: All numbers in parenthesizes are frequencies per hundred sherds. Artifact frequencies for each individual structure are relative to that structure. Total counts and artifact frequencies are based on total artifacts for the household.

Table 5.2 Site 386–Group II Household Assemblage

Artifact Category	Str. 6		Str. 8		Str. 9		Total	
Mano fragment	0	(0.00)	2	(0.08)	0	(0.00)	2	(0.03)
Mano roughout	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Metate fragment	2	(0.07)	4	(0.16)	1	(0.12)	7	(0.11)
Metate roughout	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Candelero fragment	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Ocarina fragment	6	(0.21)	3	(0.12)	1	(0.12)	10	(0.16)
Stamp fragment	1	(0.03)	2	(0.08)	2	(0.23)	5	(0.08)
Figurine fragment	5	(0.17)	9	(0.36)	5	(0.59)	19	(0.30)
Figurine mold	1	(0.03)	0	(0.00)	0	(0.00)	1	(0.02)
Polishing stone	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Pigment stone	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Hacha	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Hacha blank	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Barkbeater	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Censer fragment	3	(0.10)	7	(0.28)	1	(0.12)	11	(0.18)
Sherd disk	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Pendant	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Earspool	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Sculpture	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Drill/borer	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Graver	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Projectile point	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Sherds	2892		2505		843		6240	

Note: All numbers in parenthesizes are frequencies per 100 sherds. Artifact frequencies for each individual structure are relative to that structure. Total counts and artifact frequencies are based on total artifacts for that household.

Table 5.3 Site 386–Group IV Household Assemblage

Artifact Category	Str. 13		Str. 14		Str. 13/14		Total	
Mano fragment	1	(0.02)	0	(0.00)	1	(0.01)	2	(0.01)
Mano roughout	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Metate fragment	1	(0.02)	4	(0.04)	0	(0.00)	5	(0.02)
Metate roughout	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Candelero fragment	4	(0.07)	1	(0.01)	3	(0.04)	8	(0.03)
Ocarina fragment	3	(0.05)	13	(0.12)	1	(0.01)	17	(0.08)
Stamp fragment	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Figurine fragment	13	(0.23)	15	(0.14)	12	(0.17)	40	(0.17)
Figurine mold	1	(0.02)	4	(0.04)	0	(0.00)	5	(0.02)
Polishing stone	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Pigment stone	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Hacha	1	(0.02)	1	(0.02)	0	(0.00)	2	(0.01)
Hacha blank	1	(0.02)	0	(0.00)	0	(0.00)	1	(0.01)
Barkbeater	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Censer fragment	22	(0.39)	17	(0.16)	19	(0.27)	58	(0.25)
Sherd disk	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Pendant	2	(0.04)	0	(0.00)	1	(0.01)	3	(0.01)
Earspool	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Sculpture	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Drill/borer	1	(0.02)	0	(0.00)	1	(0.01)	2	(0.01)
Graver	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Projectile point	0	(0.00)	3	(0.03)	1	(0.01)	4	(0.02)
Sherds	5702		10,513		7026		23,241	

Note: All numbers in parenthesizes are frequencies per 100 sherds. Artifact frequencies for each individual structure are relative to that structure. Total counts and artifact frequencies are based on total artifacts for that household.

Table 5.4 Site 485 Household Assemblage

Artifact Category	Str. 3		Str. 7		Str. 10		Total	
Mano fragment	1	(0.02)	1	(0.05)	1	(0.02)	3	(0.02)
Mano roughout	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Metate fragment	0	(0.00)	4	(0.19)	1	(0.02)	5	(0.04)
Metate roughout	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Candelero fragment	1	(0.02)	0	(0.00)	4	(0.09)	5	(0.04)
Ocarina fragment	2	(0.04)	4	(0.19)	0	(0.00)	6	(0.05)
Stamp fragment	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Figurine fragment	11	(0.21)	5	(0.23)	4	(0.09)	20	(0.17)
Figurine mold	1	(0.02)	0	(0.00)	0	(0.00)	1	(0.01)
Polishing stone	1	(0.02)	0	(0.00)	0	(0.00)	1	(0.01)
Pigment stone	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Hacha	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Hacha blank	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Barkbeater	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Censer fragment	14	(0.27)	4	(0.19)	4	(0.09)	22	(0.19)
Sherd disk	0	(0.00)	0	(0.00)	1	(0.02)	1	(0.01)
Pendant	1	(0.01)	0	(0.00)	0	(0.00)	1	(0.01)
Earspool	1	(0.02)	0	(0.00)	0	(0.00)	1	(0.01)
Sculpture	0	(0.00)	0	(0.00)	1	(0.02)	1	(0.01)
Drill/borer	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Graver	2	(0.04)	0	(0.00)	0	(0.00)	2	(0.02)
Projectile point	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Sherds	5211		2161		4372		11,744	

Note: All numbers in parenthesizes are frequencies per 100 sherds. Artifact frequencies for each individual structure are relative to that structure. Total counts and artifact frequencies are based on total artifacts for that household.

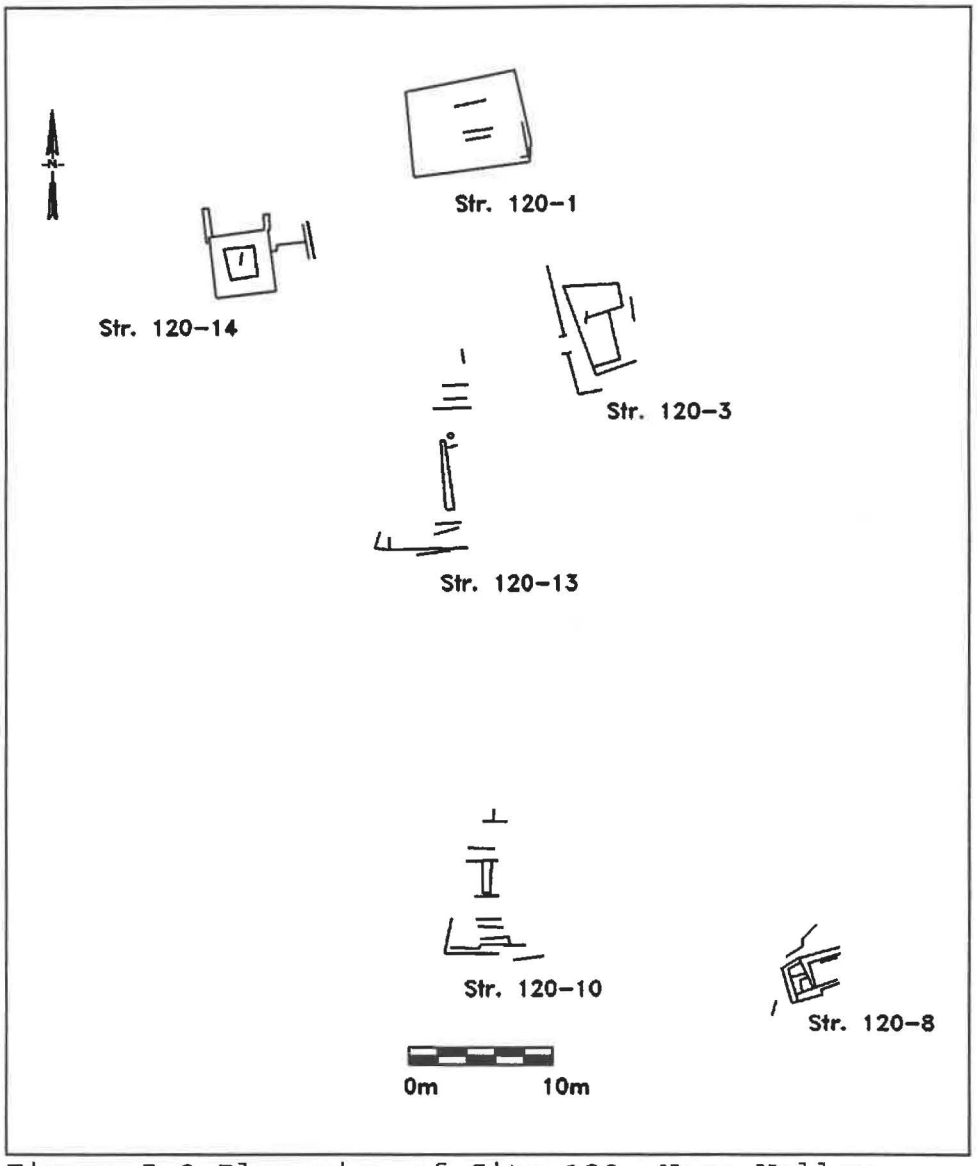


Figure 5.2 Plan view of Site 120, Naco Valley.

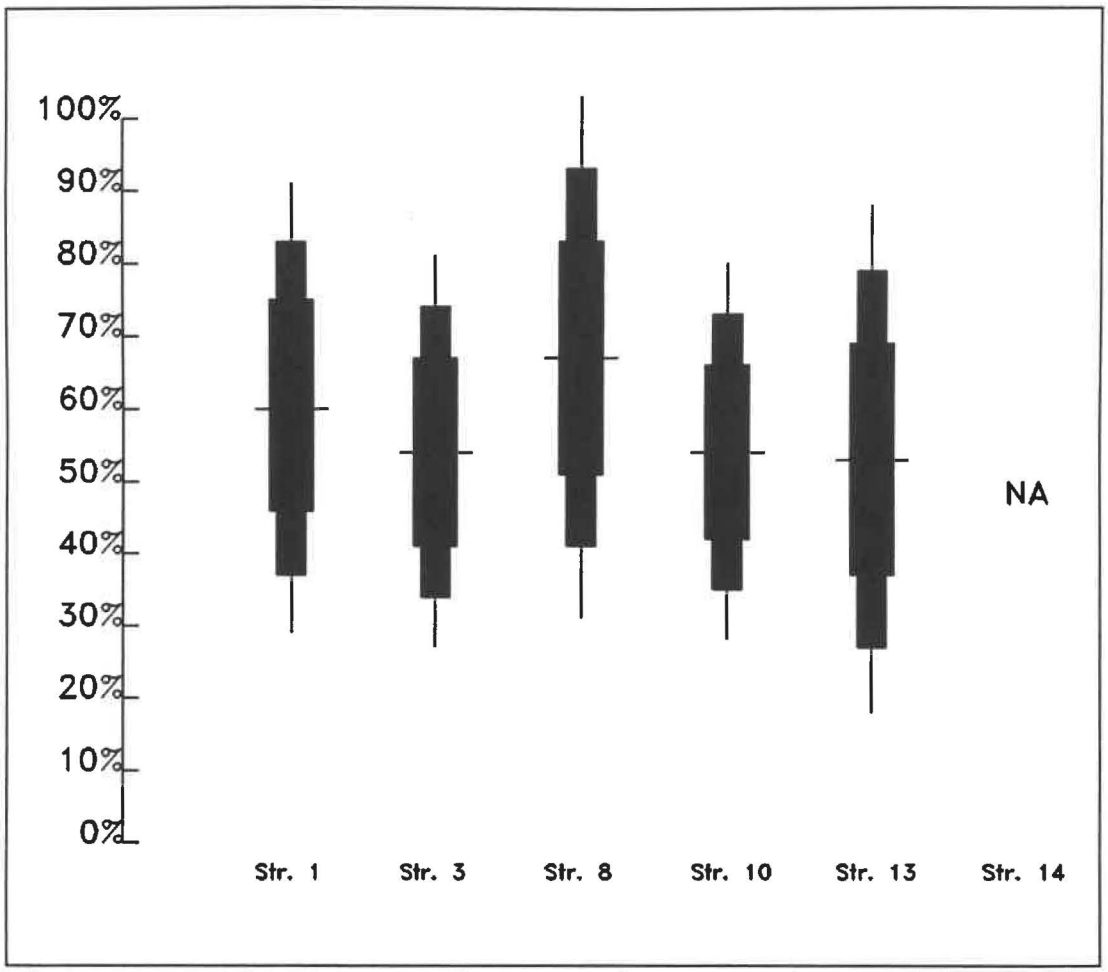


Figure 5.3 Site 120 estimates of proportions of bowl rim sherds per structure with error ranges for 80%, 95% and 99% confidence levels.

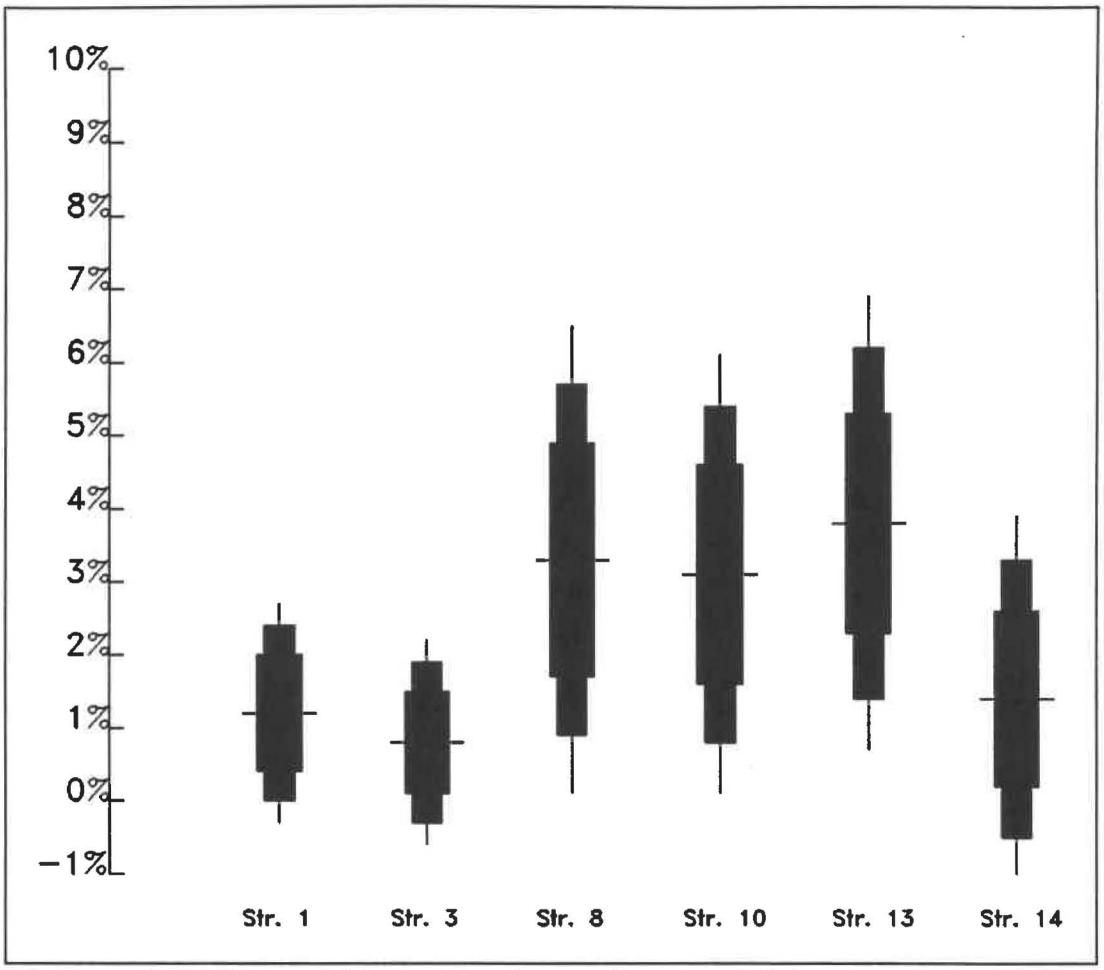


Figure 5.4 Site 120 estimates of proportions of imported and elaborately decorated sherds per structure with error ranges for 80%, 95% and 99% confidence levels.

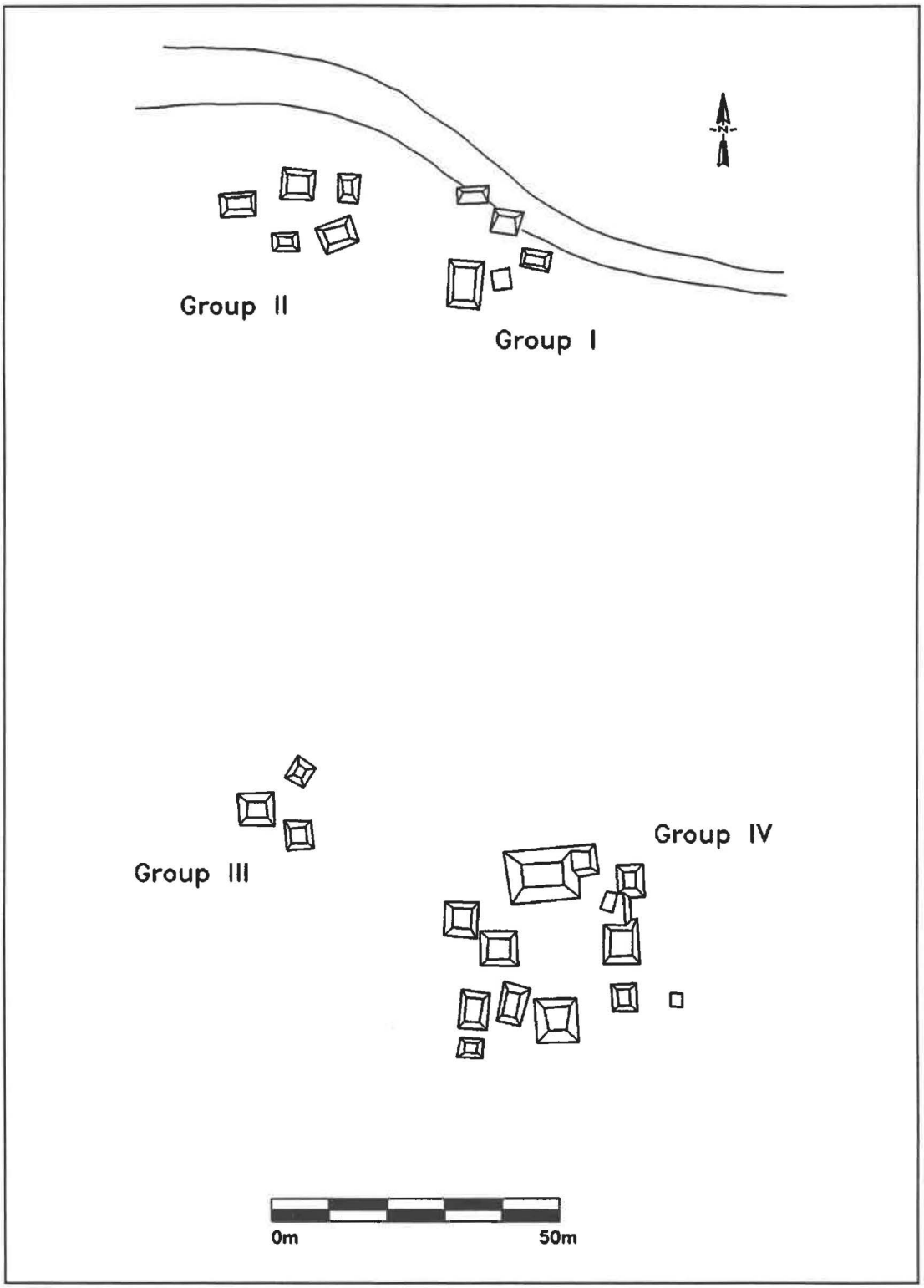


Figure 5.5 Map of Site 386, Naco Valley.

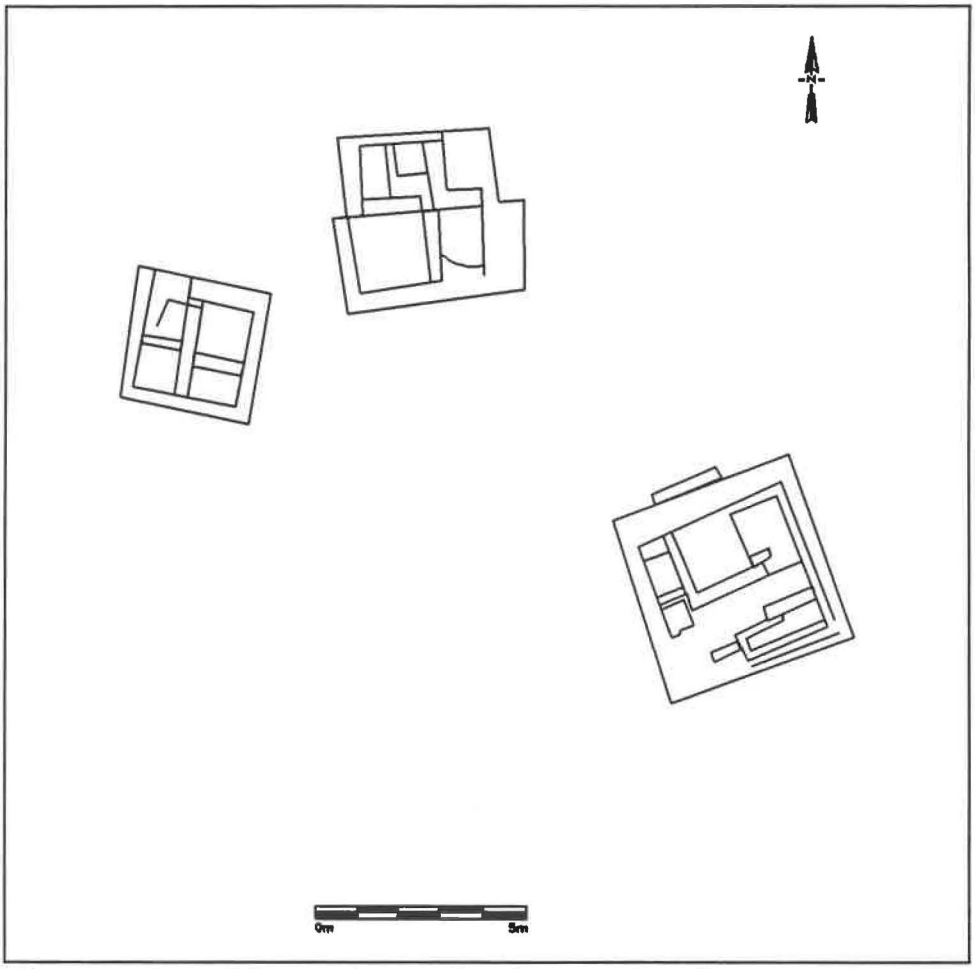


Figure 5.6 Plan view of Site 386, Group II, Naco Valley.

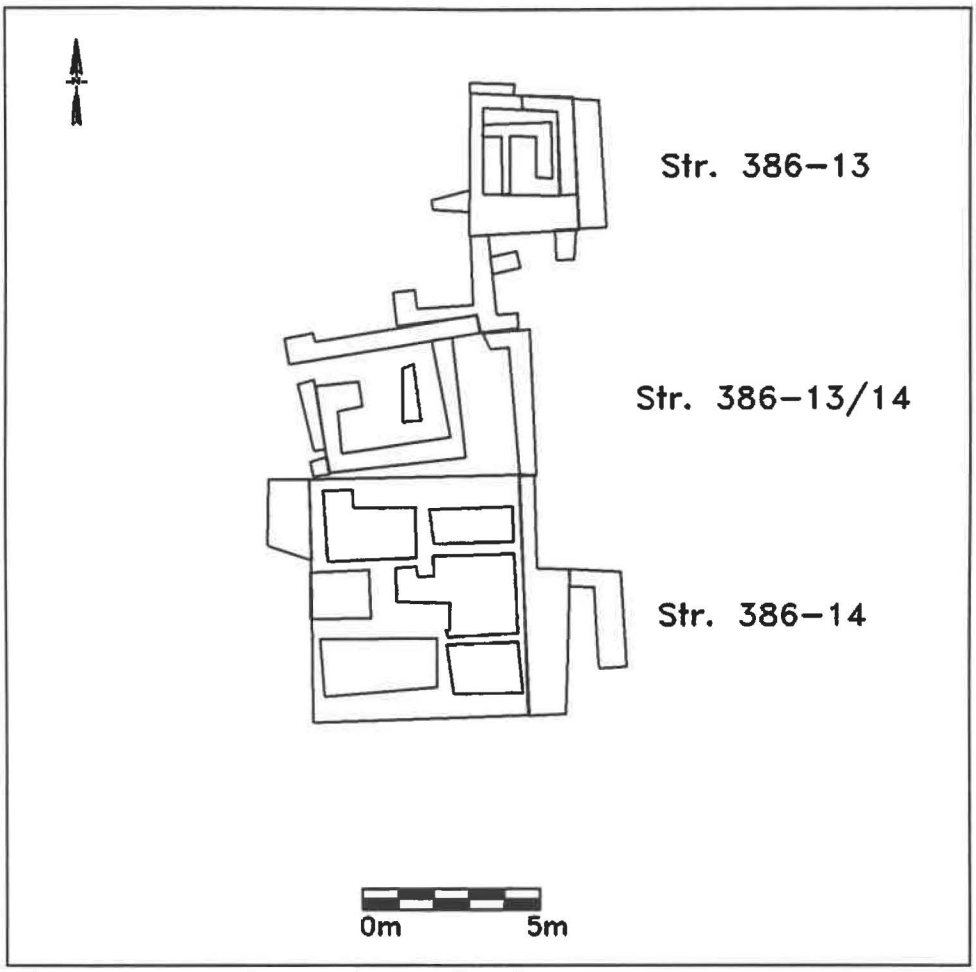


Figure 5.7 Plan view of Site 386, Group IV, Naco Valley.

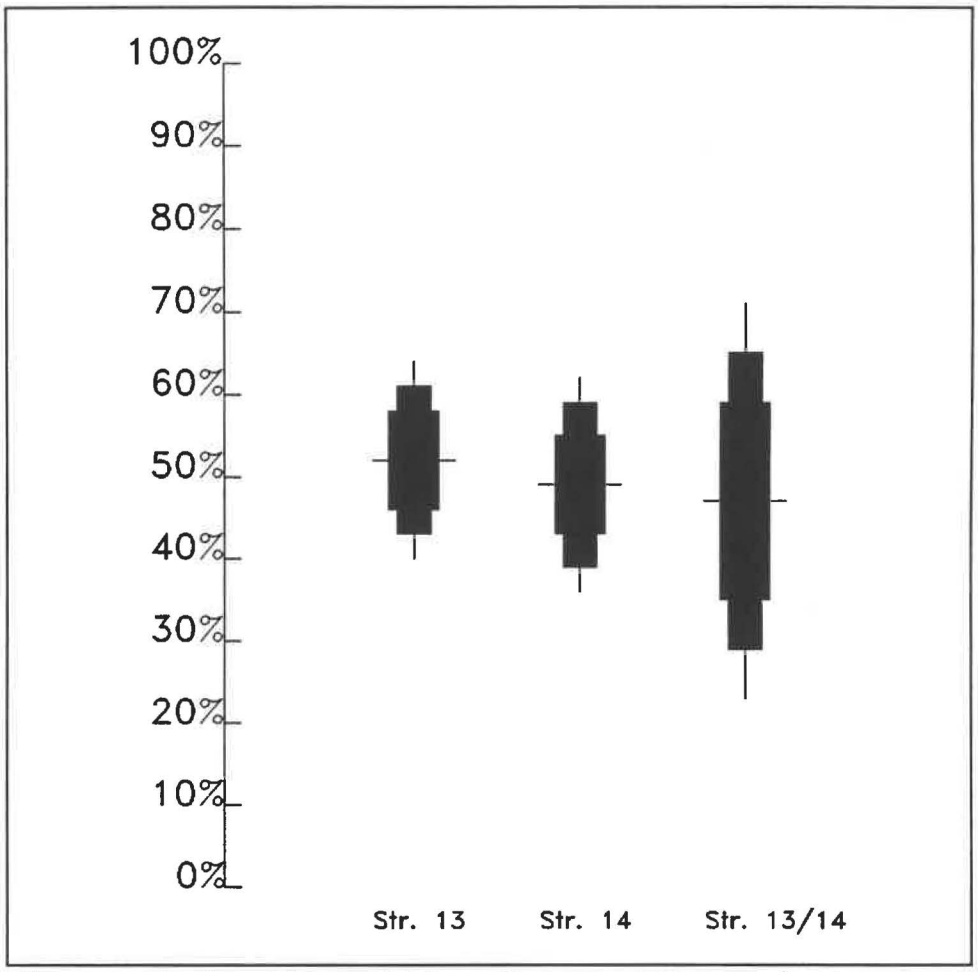


Figure 5.8 Site 386, Group IV estimates of proportions of bowl rim sherds per structure with error ranges for 80%, 95% and 99% confidence levels.

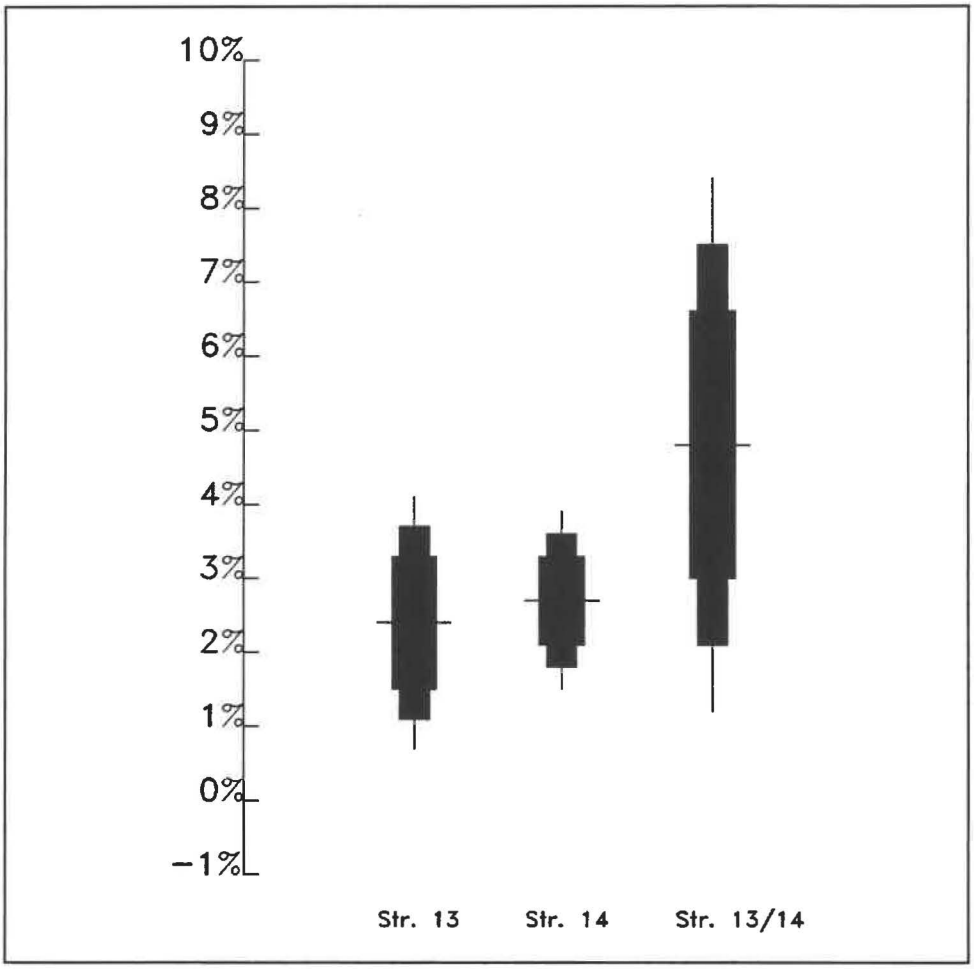


Figure 5.9 Site 386, Group IV estimates of proportions of imported and elaborately decorated sherds per structure with error ranges for 80%, 95% and 99% confidence levels.

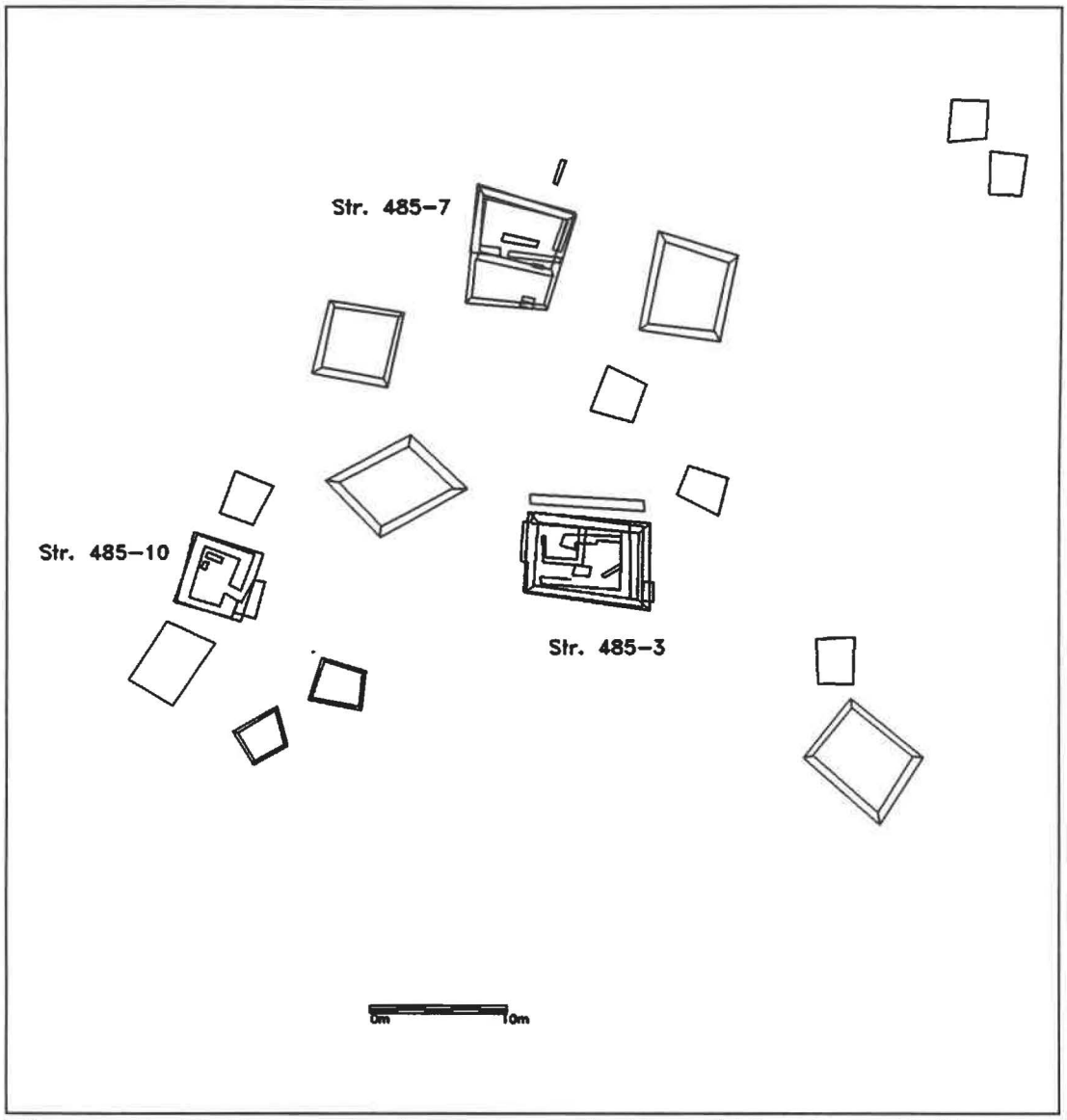


Figure 5.10 Map and plan view of Site 485, Naco Valley.

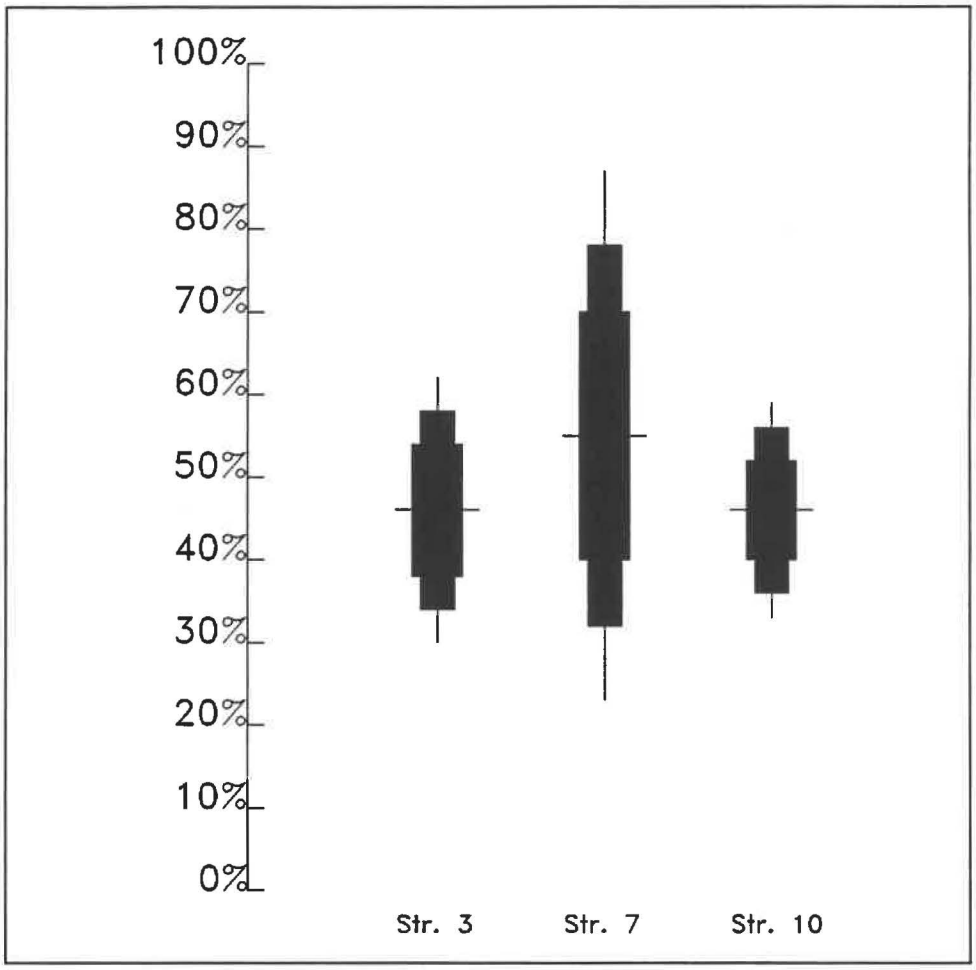


Figure 5.11 Site 485 estimates of proportions of bowl rim sherds per structure with error ranges for 80%, 95% and 99% confidence levels.

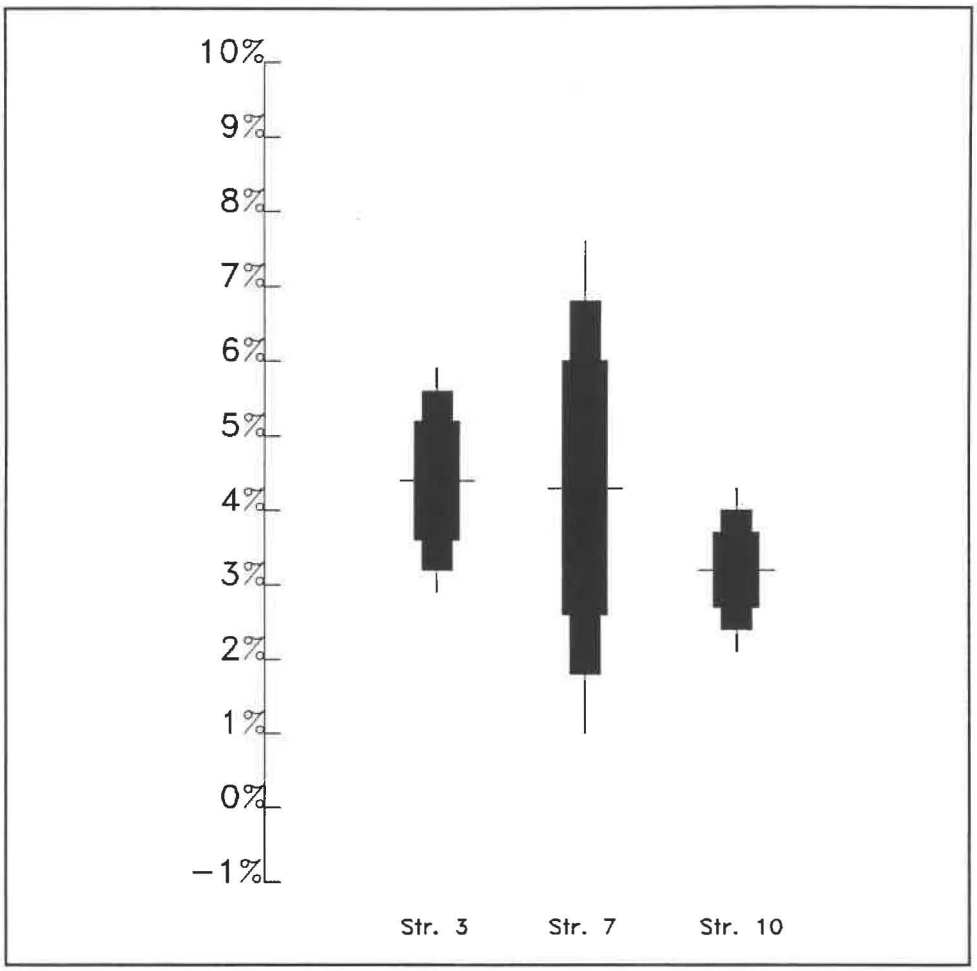


Figure 5.12 Site 485 estimates of proportions of imported and elaborately decorated sherds per structure with error ranges for 80%, 95% and 99% confidence levels.

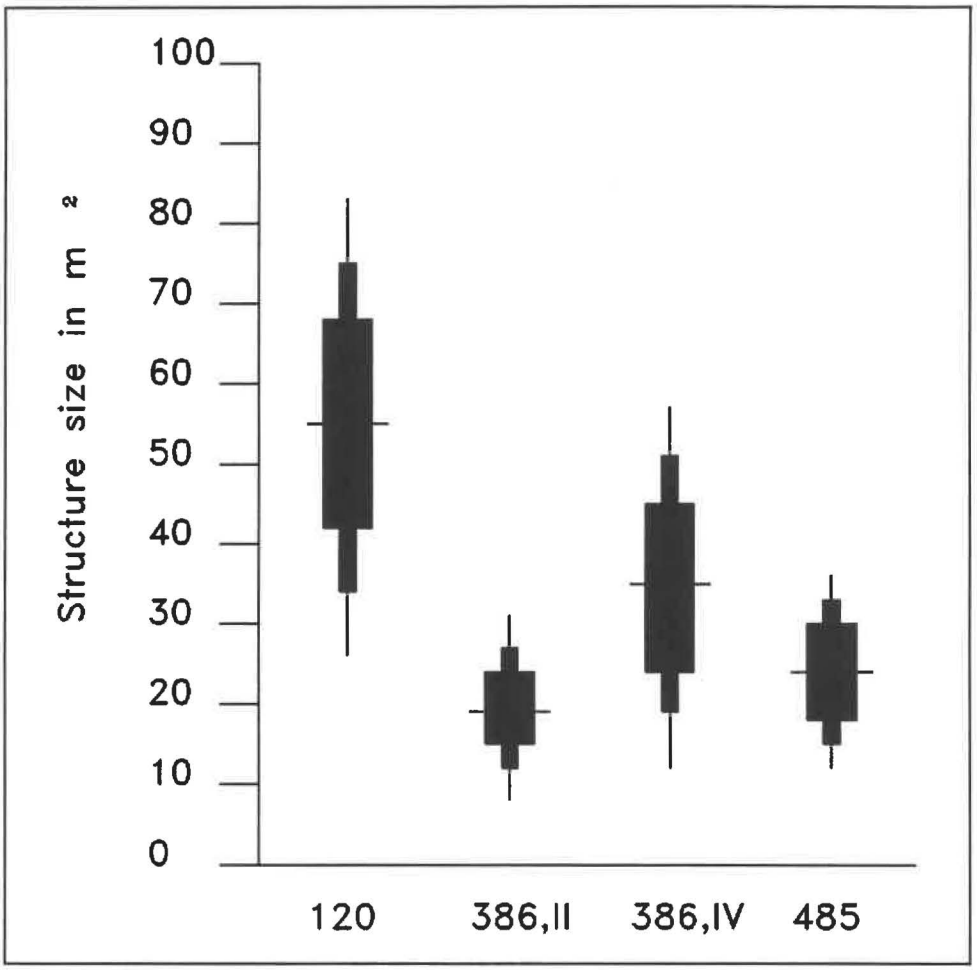


Figure 5.13 Mean structure size per large household with error ranges for 80%, 95% and 99% confidence levels.

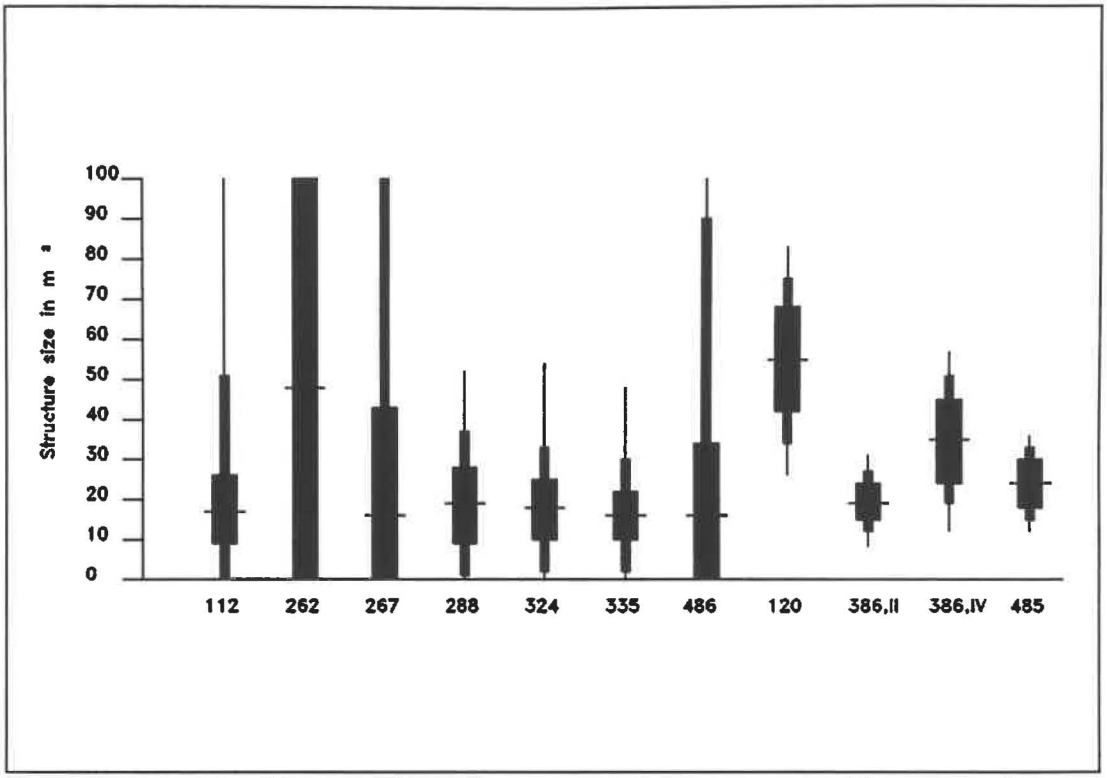


Figure 5.14 Mean structure size per small and large household with error ranges for 80%, 95% and 99% confidence levels.

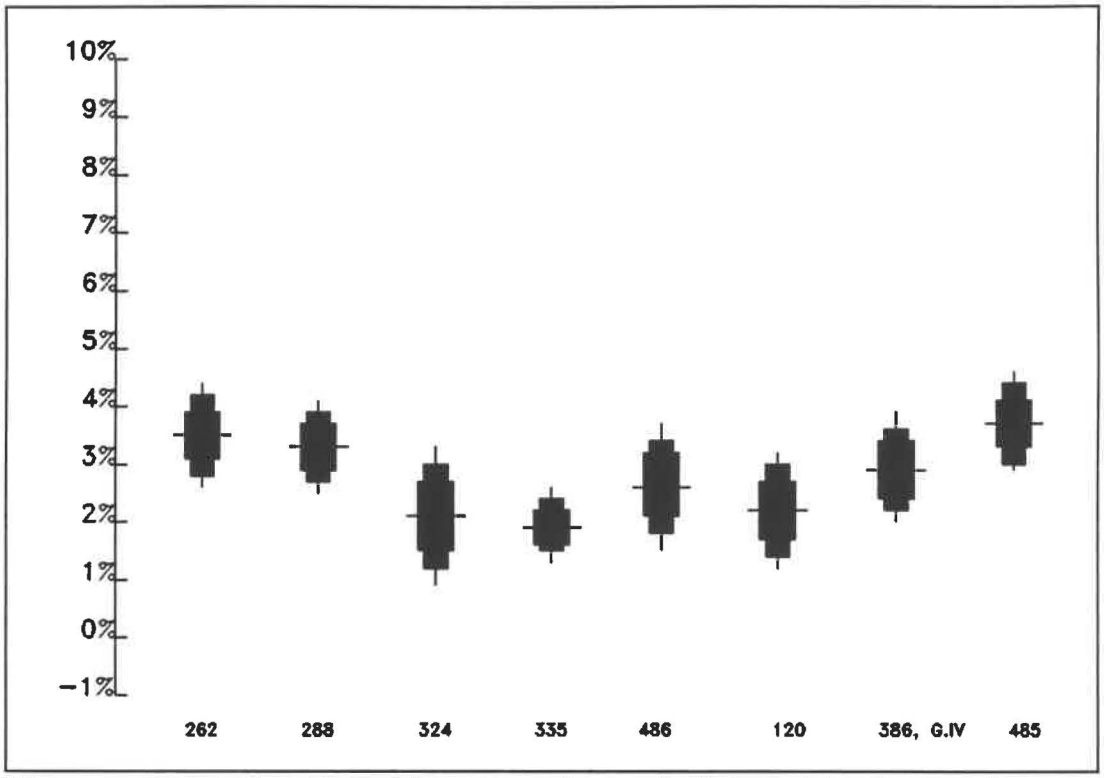


Figure 5.15 Small and large household estimates of mean proportions of imported and elaborately decorated sherds per household with error ranges for 80%, 95% and 99% confidence levels.

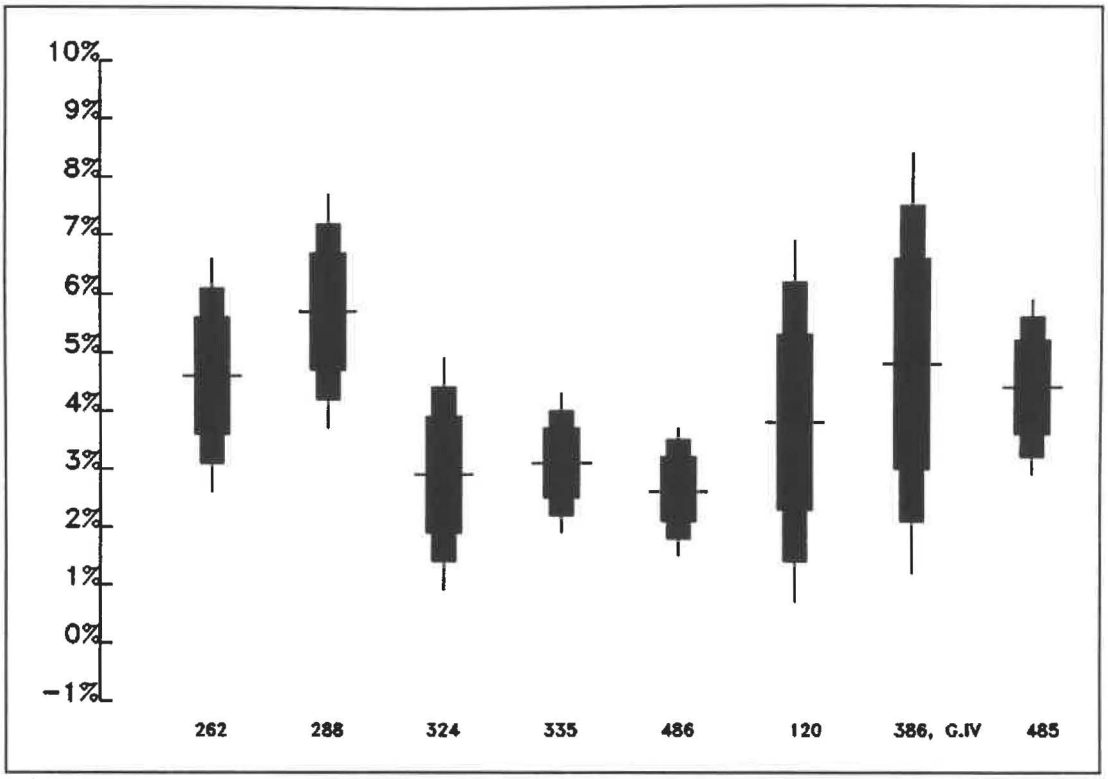


Figure 5.16 Small and large household estimates of the highest estimated proportions of imported and elaborately decorated sherds per household with error ranges for 80%, 95% and 99% confidence levels.

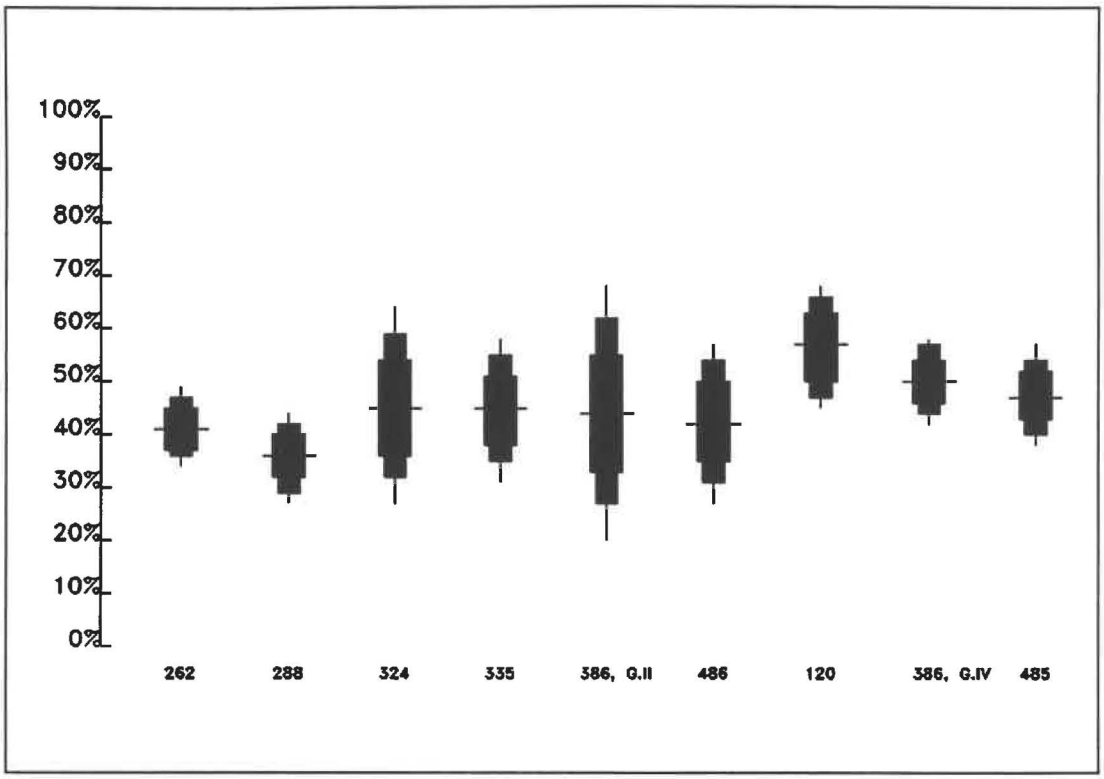


Figure 5.17 Small and large household estimates of mean proportions of bowl rim sherds per household with error ranges for 80%, 95% and 99% confidence levels.

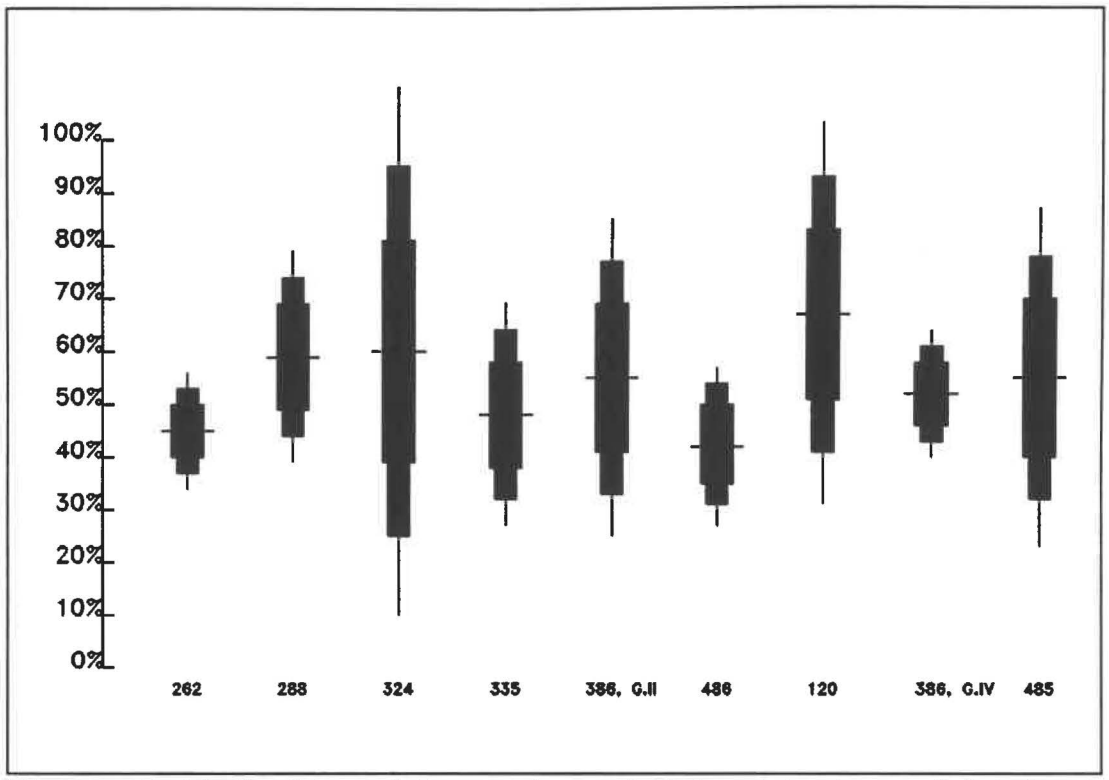


Figure 5.18 Small and large household estimates of highest proportions of bowl rim sherds per household with error ranges for 80%, 95% and 99% confidence levels.

CHAPTER 6

CONCLUSIONS

Introduction

At the beginning of Chapter One, Netting (1979) was quoted as arguing that peasant farmer households are intensely sensitive to their surroundings. Chapters One through Five have shown that rural agrarian households in the Naco Valley, across time and space, were diverse in their household composition/size, production strategies and wealth levels, among other things. In this final chapter, research questions and proposed models are evaluated, based upon the data presented in Chapters Two, Three, Four and Five. Subsequently, new models are offered for future research, as well as an appraisal of the limitations of the current study.

Research Question #1: Do households on different soils exhibit similar production patterns? If not, how do households differ in the range, organization and intensity of production?

As noted in Chapters Four and Five, a number of different activities are present in small and large households. There was not a single activity that all households in the sample performed, based upon artifactual remains. Households on different soils did not perform similar activities and some activities were only undertaken on a single soil class. No households in the study evidenced direct or conclusive

confirmation of production organized above the level of independent, part-time household production. Certainly, as discussed below, some households undertook unusual or unique activities. However, there is little evidence that households created goods in a specialized manner for either non-kin consumers or for elite use. Evidence of ground stone manufacture at Site 262, discussed below, may be an exception to this general trend.

A total of ten activities related to production have been identified in small and large households in this study (see Figure 6.1). Concentrated grinding (food processing) activities, as evidenced by high relative frequencies of manos and metates, suggests that some households prepared more maize (for cornmeal) than was necessary for their immediate consumption. Differences in the distribution of metates were very significant (chi-square=31.54, df=9, $p<0.001$). Three households, those at Sites 262, 324 and 486, were identified with more than double the expected proportion of metates. Of the six households containing manos, those at Sites 262 and 324 distinguish themselves by containing much higher frequencies than expected. Overall, the differences in the distribution of manos among those households containing them was highly significant (chi-square=11.1, df=5, $0.05>p>0.02$). Three households, those at Sites 324, 386 Groups II and IV, contained single examples of grinding stones. All three households with signs of intensive maize grinding are located on Class I soils, which may suggest that some households on

more fertile soil were better able to produce surplus crops than households on less productive soil. While there is evidence of this intensified production, it is unusual to think of maize being traded in a processed form, such as cornmeal, rather than in either cob or kernel form.

A single household, located in the northern cluster of Site 262, appears to have been producing grinding stones, as evidenced by both much higher than expected frequencies of metates and manos, as well as the only examples of roughouts identified in the sample. As noted in Chapter Four, it is quite possible that this household was creating roughouts for completion at La Sierra, finished goods for exchange at La Sierra or elsewhere, or for use/consumption by elites at La Sierra. The paired numbers of manos and metates, in addition to the unexpectedly high frequency of pigment stones, may suggest consumption by non-kin consumers, thus suggesting part-time specialization. However, due to the low numbers of mano and metate roughouts, it is possible that these were produced for local consumption. As noted in Chapter Four, ground stone was uncovered in each excavated structure in relatively equal proportions. This may indicate that all household members partook in concentrated maize grinding.

Hacha production was undertaken in two households, those at Sites 335 and 386, Group IV, as evidenced by hacha blanks. Although such low frequencies make definitive statements difficult, the differences between the frequencies of hacha blanks are highly significant (chi-square=4.64, df=1,

differences in the frequencies of projectile points are most likely due to the vagaries of sampling (chi-square=0.107, df=2, $p<0.5$). Therefore, it appears that households located on all three soil classes undertook hunting activities in similar intensities. While not directly related to the question at hand, this evidence of hunting seems to correspond with household wealth; over all, these three households are among the wealthiest in the study.

All four large households, those at Sites 120, 386, Groups II and IV, and 485, engaged in part-time figurine manufacture. Any observed differences in the frequencies of figurine molds are not very significant (chi-square=0.91, df=3, $p<0.5$). Therefore, there is little evidence that households located on less fertile agricultural soils are producing figurines more intensively than other households with figurine molds or on more productive agricultural land.

There is very limited, indirect evidence of ceramic manufacture. Three households, those at Sites 288, 485 and 486, all have single examples of sherd disks, possibly used in shaping pottery before firing. The household at Site 485 contained a solitary polishing stone. Any observed differences in the frequencies of sherd disks between these three households are most likely due to the vagaries of sampling (chi-square=1.39, df=2, $p=0.5$). All three of these households are located on Class I soils.

Paper manufacture, as evidenced by the presence of barkbeaters, was undertaken at two households, Sites 262 and

335. There are no significant differences in the frequencies of barkbeaters between these two households (chi-square=0.04, df=1, $p<0.5$). Therefore, there does not appear to be any difference in the intensity of paper production between households located on different soil classes.

Finally, stamp decoration of paper or textiles was undertaken by a number of households, namely those at Sites 120, 262, 288, 324, 386, Group II and 486. The households at Sites 386, Group II and 486 both appear to have intensified production compared to other households, each with nearly, or more than, double the expected number of stamps. However, any observed differences in the distribution of stamps between all households are not very significant (chi-square=8.37, df=5, $0.2>p>0.1$). It does not appear that households on Class III soils produced decorated paper or textiles in any greater intensity than households on more fertile soils.

In conclusion, then, it appears that while some households did undertake unique or unusual production activities, there is no clear evidence suggesting that households located on less fertile agricultural soils intensified production more readily than those located on better agricultural soils. Of these ten activities, only two were concentrated in particular locales: maize processing and hacha production. Concentrated maize processing occurred on Class I soils, while hacha manufacture was limited to households on Class III soil. Occupants of Sites 335 and 386, Group IV were unusual in their production of hachas, as were

had a substantial affect on the range or intensity of household production.

Research Question #2: Does household wealth or composition vary among households depending on the quality of soils? Specifically, do wealth differences cross-cut soil classes, or is there a close relationship between wealth and soil fertility?

As discussed in Chapter Three, there are three primary lines of evidence used in determining household wealth: house architecture; elaborately decorated and imported ceramic sherd proportions; and bowl rim sherd proportions.

Ethnographic studies suggest that wealthy households may have larger houses than less wealthy households (e.g. Hayden and Cannon 1982). It appears that differences in mean house size cross-cut soil classes (see Figure 6.2). As suggested in Chapter Five, differences in mean house size appear to be much more a factor of household size (small vs. large) than soil quality. The household at Site 120 appears to be from a different, higher mean house size population than any other household studied. However, due to large error ranges in some households, it is difficult to state this with high confidence. For those households with smaller error ranges, it appears that the mean house size of the household at Site 386, Group IV is significantly higher than other households, save that at Site 120. Therefore, it appears that wealthier households, based upon mean house size of the small sample

and imported ceramics, with no clearly defined clusters. However, it does appear that households located at Sites 262, 288 and 485, all located on Class I soils, contain a higher proportion than other households. These differences appear to be small; nevertheless, they are very significant. These ceramic types are, by definition, rare and therefore these small differences of between, roughly, 1% and 5% of the total ceramic assemblage are windows into how to view household wealth. On the surface, the difference between 1% and 3% may seem slight. However, if viewed as one household possessing three times the amount of elaborately decorated or imported ceramics than another household, this makes the confidence levels used in Figures 6.3 and 6.4 appear clearer.

Comparison of the mean proportion of bowl rim sherds per household (see Figure 6.4) indicates that, while there is a gradation from higher to lower proportions among households, Site 120 appears to have a significantly higher proportion than any other household. Due to large error ranges, it is difficult to state with high confidence that there are any significant differences in the mean proportion of bowl rim sherds between households at Sites 324, 335, 386, Group IV, 485 and 486. It may be stated, however, that the mean proportions of bowl rim sherds at households located at Sites 120 and 386, Group IV are significantly higher than the proportions at Sites 262 and 288. It appears that households on less productive agricultural land engaged in more intensive

feasting, as measured by the mean proportion of serving vessels per household, than households on better agricultural land.

In sum, then, it appears that there may be an inverse relationship between household wealth and the quality of the land households occupy. The wealthiest household in the sample, that at Site 120, is located on Class II soil. Other households, including Site 386, Group IV, located on Class III soil, are on the higher end of the gradation of wealth. For the Household Wealth, Composition and Agricultural Potential Model to accurately describe events in the Late Classic Naco Valley, wealthier and larger households would be located on Class I soils. Instead, it appears that wealthier households in this sample, based upon bowl rim sherd proportions and mean household size, are generally located on less fertile soil. This suggests that wealth may not have been a direct function of the quality of agricultural land to which households had access. Some households on poorer soils, such as those at Sites 120 and 386, Group IV may have had access to more labor for construction of larger houses through competitive feasting. As noted in Chapter Two, these households may not have had a severe shortage of agricultural products, given their hypothesized access to Class I soils within a short distance of their homesteads.

Research Question #3: Does household wealth correspond with the intensity or degree of production?

Household wealth does not appear to have any clear relationship with the intensity or degree of production. Two of the wealthier households in the sample, those located at Sites 120 and 386, Group IV, appear to have undertaken similar ranges of activities in similar intensities to those attested to at households with evidence of less wealth. It does appear that wealthier households share an affinity for figurine manufacture which is not shared by other households. More directly, as noted above, the wealthiest households in the sample appear to be engaged in hunting activities, based upon the presence of projectile points. While it will be noted later in this chapter that there does appear to be a relationship between hunting activities and access to hypothesized forested areas, hunting and access to better cuts of meat in the Maya lowlands is generally associated with elites and other wealthy households and individuals. Faunal analysis would be helpful in evaluating this hypothesis for the Late Classic Naco Valley; unfortunately, like human skeletal remains, they do not preserve well in the valley. There may be a weak relationship between household wealth and the range of activities. For example, the household at Site 324 has a relatively low proportion of imported and elaborately decorated ceramics and undertook only two different production activities. It does not appear that poorer households are producing at higher volumes than

wealthier households, as the Ecology of Production Model assumes. There is some evidence to suggest that wealthier households may engage in more types of activities than poorer households, but not necessarily in greater intensity or concentration. Therefore, there may be some evidence to suggest that aspects of the Good Resource Production Model may relate to rural Late Classic production patterns.

Research Question #4: Does household wealth vary with distance from the regional capital?

As outlined above, household wealth has been discussed by utilizing three different lines of evidence. It has been hypothesized that households closer to their respective capital will have greater access to items of wealth, which may be controlled by elites. Therefore, wealth in this context may be related to access to elaborately decorated or imported ceramics. There is a moderate, and very significant, negative correlation between the distance from households to La Sierra (X) and their respective mean proportion of elaborately decorated and imported ceramics (Y) ($r = -0.726$, $p=0.027$, $Y = -0.003X + 0.048$). It appears, therefore, that the further away from La Sierra households are, the less access they have to these restricted vessel types.

Household wealth, as discussed in Chapter Three, may also be viewed as the ability of households to undertake feasting rituals which include large social gatherings of non-household members. Households gain wealth and prestige through

competitive generosity, debts incurred during these feasts than being used for labor mobilization, either for household use in building construction, or possibly for use by elites at La Sierra. There does appear to be a moderate, and somewhat significant, positive correlation between household distance to La Sierra (X) and mean household bowl sherd proportions (Y) ($r=0.629$, $p=0.07$, $Y = 0.025X + 0.291$). However, there is a weak, and not very significant, positive correlation between household distance to La Sierra (X) and mean household structure size (Y) ($r=0.455$, $p=0.16$, $Y = 2.961X + 9.282$). This moderate, and somewhat significant, positive relationship between household distance to La Sierra and mean household bowl rim sherd proportion may suggest that those households further from La Sierra, which did not have as easy access to imported goods as closer households, were able to create their own, somewhat independent wealth by investing more effort in feasting rituals. Households relatively far from La Sierra, such as at Site 120, may have been able to mobilize more labor to create larger structures through competitive generosity.

Therefore, it appears, overall, that there is only a moderate to weak correlation between household wealth and distance to La Sierra. This indicates that close proximity to elites at La Sierra did not have a direct affect on the ability of households to obtain prestige goods. In sum, then, it appears that Late Classic rural settlement and household wealth accumulation patterns contradict the Wealth Centralization Model. Households further from La Sierra appear

favored good agricultural soils close to what are today permanent water sources.

Analysis of Late Classic household settlement patterns on classified soils, as was outlined in Chapter Two, suggests that there are no significant differences in mean household size between soil classes. As a household grows, it will either segment, thus increasing the size of the household, or it will fission, where some members will leave and found their own households somewhere else. It was hypothesized that households on poorer agricultural land may fission more readily than other households due to the poor quality of inheritable agricultural land. The absence of significant differences in mean household size between sites on different soil classes (see Figure 2.8), therefore, suggests that households on Class III soils did not fission more readily than households on better agricultural land.

Households on Class III soils appear in box-and-dot plots (see Figure 2.7) to have a more restricted size range and variation than those on more fertile soils, however. This pattern may suggest that the former are the remains of younger households. Because survey data was used for broad time periods (the Late Classic period extends over a 350 year period) this is only an implication; more extensive ceramic analysis of surface remains from all households on Class III soils would be required to fully examine this hypothesis. Excavations of households on Class III soils, including some not included in this study, do not necessarily indicate that

Class III soils were settled later during the Late Classic than other areas of the valley. Beyond ceramic data used for dating, architectural evidence suggests that all excavated structures on Class III soils received multiple renovations.

While the Founder Household Model does not fit well with the specific evidence from the Naco Valley for early periods, given that households do not appear to continuously occupy a given area for the entire occupation of the valley, there is some data to support portions of the model. Site 386, Group IV, for example, was occupied beginning in the Early Classic; in fact, it was the only location occupied on Class III soil during this period. By the late Classic, this household appears to be large, diverse in house sizes and activities (i.e. heterogeneous), and one of the wealthiest rural households in the sample. The principle of first occupancy (see McAnany 1995) for Class III soils, rather than for the valley itself, may help explain why this household is so wealthy. By occupying this area longer than any other household located on the soil class, household members may have been able to attract non-kin families to join the household, helping to create a heterogeneous household with greater access to labor than many other households, used in part for the creation and maintenance of large structures. Furthermore, these non-kin households may have been attracted to the household at Site 386 Group IV because it had been able, due to its first occupancy of the area, to control larger or more advantageous plots of agricultural land on

Class I soil close to the settlement than later inhabitants on Class III soils nearby.

Similar mean household sizes on each major soil class indicate that there may be a household size module, an ideal household size to which households aspired, whether it was dictated ideologically by elites at La Sierra, or was a self-imposed desire of rural household inhabitants. Elite demands on commoner labor may well have been a factor in creating this ideal, even if elites did/could not specify household size (Edward Schortman 1999, personal communication). Analysis of mean household size in other areas of the Southeast Periphery would be useful for a comparison.

La Sierra and the Hinterlands: How do Households Compare?

The focus of this dissertation has been on agrarian, rural households. Certainly, as was pointed out in Chapter One, the distinctions between "rural" and "urban" are somewhat artificial for the Maya Lowlands. In many portions of the Old World, cities are primate and centralized, with sparse occupation in the countryside. In the Maya Lowlands, on the other hand, settlement is more continuous, with hamlets and villages located on a landscape interspersed with horizontally-spread and densely packed urban centers. Over all, the "rural" areas of the Maya lowlands are more heavily occupied than areas of the Old World, from where this terminology originated.

A distinction between settlement within La Sierra (a more "urban" area) and other portions of the Late Classic Naco Valley (the hinterland, more "rural" areas) is important, however, due to the stark contrasts in settlement. La Sierra, as noted in Chapter One, is a very primate center, with ten times the occupation of the next largest settlement. There was clearly forced settlement of some households in the valley by elites to nucleate within La Sierra. Outside of La Sierra, there is dispersed settlement of households, with settlement nucleation in several regional centers or villages. Certainly, given this contrast of households located in the hinterlands, far from the next household settlement, and households located adjacent to other households within the core of La Sierra, this distinction of "urban" and "rural", even with its associated conceptual baggage, is useful.

The discussion of research questions above has offered several lines of evidence for distinguishing household wealth. Some households, including those located at Sites 120, 262, 386 Group IV and 485, have been identified as wealthier households in the rural sample. Given the nature of the La Sierra core, with generally large buildings, cut-block architectural construction, and its associated emphasis on elite activities, and the lack of these characteristics in the hinterlands poses a serious question of comparability. That is, how likely is it that the entire rural sample used in this dissertation is simply a sample of gradations of poorer households, compared to households within La Sierra? Are

households within La Sierra significantly wealthier than households in rural areas?

To evaluate this query, I use data from two households located within or near the urban core of La Sierra. Operation 39 (see Figure 6.5), a small, seven mound household, is located just south of the main (elite ceremonial core) group of La Sierra (for a complete discussion of architecture and excavation of this household, see Ross 1991). Located in the near periphery, ca. 450 m northwest of the main group, Operation 92 is also used in this discussion. Consisting of eleven structures, nine of which are visible, Operation 92 represents a large household (for detailed information on architecture and excavation of this household, see Henderson 1991).

Architectural information on mean house size per household, as illustrated in Figure 6.2, indicates that neither household has either disportionately large or small structures. Clearly, the mean structure size from the household at Site 120 is significantly larger than either of these households at La Sierra. The mean structure size at Operation 39 appears to be similar to that at site 386, Group IV, while that at Operation 92 is significantly smaller, much more similar in mean size to those at Sites 288, 324, 335 or 386, Group II.

The estimated mean proportions of imported and elaborately decorated ceramics for both urban and rural households are illustrated in Figure 6.3. Here, there are

striking differences between households at La Sierra and those in the hinterlands; both La Sierra households have significantly higher proportions of elite-restricted ceramics than any rural household, save that at Site 485. While it is difficult to state with confidence that the proportion of ceramics from the household at Site 485 is significantly lower than that from Operation 39, the portion from Operation 92 is significantly higher than any estimated mean proportion from any rural household. Therefore, it appears that, based on this limited sample, there is a fairly continuous gradation between households for access to elite-controlled ceramics, with urban households at the higher end of this spectrum.

The estimated mean proportions of bowl rim sherds per household, both rural and urban, are illustrated in Figure 6.4. Here, as was the case with elaborately decorated and imported ceramics, those households at La Sierra have significantly higher proportions of bowl rim sherds than all rural households, save that at Site 120. This indicates that, like elaborately decorated and imported ceramics, there is generally a continuous gradation in feasting activities, with urban households possibly engaging more heavily than many rural households.

Therefore, overall, it appears that while there are some significant differences between households at La Sierra and those in the hinterlands in several different measurements, there does not appear to be a large gap between urban and rural households; generally, there is a continuum from lower

to higher measurements. While mean structure size at La Sierra does not appear to have been significantly different than other examples in the hinterlands, both estimated mean elaborately decorated and imported ceramic and bowl proportions were significantly higher at La Sierra than almost all rural households. Therefore, it does not appear that the rural sample of households represented merely a gradation of "poor" households. Rather, at least one rural household was comparable to those at La Sierra, indicating that some rural households, such as those at Sites 120 or 485, were similarly prosperous. Overall, there does not appear to be stark differences between rural and urban households, but rather stages along a continuous gradation.

Household Modeling Reassessed

It appears, based on the above discussion, that the proposed research models did not fully explain the complex relationships between households and their surrounding environment. Households offered little inkling of intensive production. There is no clear evidence that activities were dictated, or shaped, by soil quality. Household wealth appears to have only a weak, and contradictory, relationship with the range of production undertaken.

What, then, based upon the data presentation, had an effect on household production? It appears to be, to borrow a common adage from real estate brokers, location, location,

location; specifically, proximate location to natural resources.

Woodworking, for example, was undertaken by a number of different households, specifically those at Sites 120, 262, 335, 386, Group IV and 485. There appears to be little evidence of intensive woodworking activities, suggesting part-time production. All of these households are located along the edges of the valley, near the upland slopes. Occupation in these areas prior to the Late Classic had been slight or non-existent. As a result, raw material for wood working may have been readily available in forests located close to these households. Areas around other households, such as at Sites 288 and 324, had been occupied for longer periods of time and, therefore, may have been partially deforested by the Late Classic. Site 288, for example, is located more centrally in the valley, closer to La Sierra, which began to witness population increases during the Early Classic. Site 324, on the north side of the Río Manchaguala, had seen continuous occupation of the general area since the Middle Formative at nearby Sites 123 and 487.

This same pattern is replicated in the evidence for hunting. While projectile points are rarely found in the Late Classic Naco Valley, the three households showing evidence of hunting are situated again on the margins of the valley, close to the upland slopes.

Site 262, with its evidence of ground stone tool production, is located directly adjacent to known natural

deposits of vesicular basalt stone, the most common material used in mano and metate production. Raw material for paper making could have been procured in the surrounding hillsides.

In this way, households immediately adjacent to natural resources, like wood, stone and game animals, would have had an easier time pursuing these tasks than those households further removed from the necessary resources. This argument is founded on Service's (1962) views on the basis of chiefly society. The amount and degree of localized environmental differentiation, Service argued, may lead to specialized production. As inhabitants in an area become increasingly sedentary, more specialized production and redistribution of those goods by a central authority will be advantageous. This coordination and allocation of specialized goods may lead to more household/societal interdependence for goods and thus may increase specialized production in localized environments. While soils are natural resources in one sense, the models proposed in Chapter One do not fully grasp the whole range of possible environmental resources available to households in the Late Classic Naco Valley. I do not argue that environmental differentiation in the valley led to the rise of social complexity. It does appear, however, that local environmental resources did have an impact on crafts pursued by rural households.

As has been noted, Late Classic mean household size did not appear to be affected by soils of varying qualities. This analysis indicated that there was no significant difference in

the developmental cycle of households on differing soil classes. One limitation of this study, as noted in Chapter Two, relates to the nature of household settlement and farming location. Certainly, households in general may farm in the vicinity of their homesteads if settlement is dispersed. However, as ethnographic research has shown, this may not necessarily mean that all farming was done directly adjacent to one's home. Instead, some farmers may farm within a three to five kilometer radius (see Killion 1992; Wilk 1984). As a result, in an area like the Naco Valley, where poor agricultural soil is concentrated in a relatively small zone, if farmers live on infertile soil, it may be relatively easy for them to travel a short distance and farm in a much more fertile plot. Class III soil is infertile, in part, because it is so stable through time it becomes increasingly weathered and eroded. This stable land, free from flooding, would have been an attractive building site for households which might compensate for daily travel to agricultural fields relatively close.

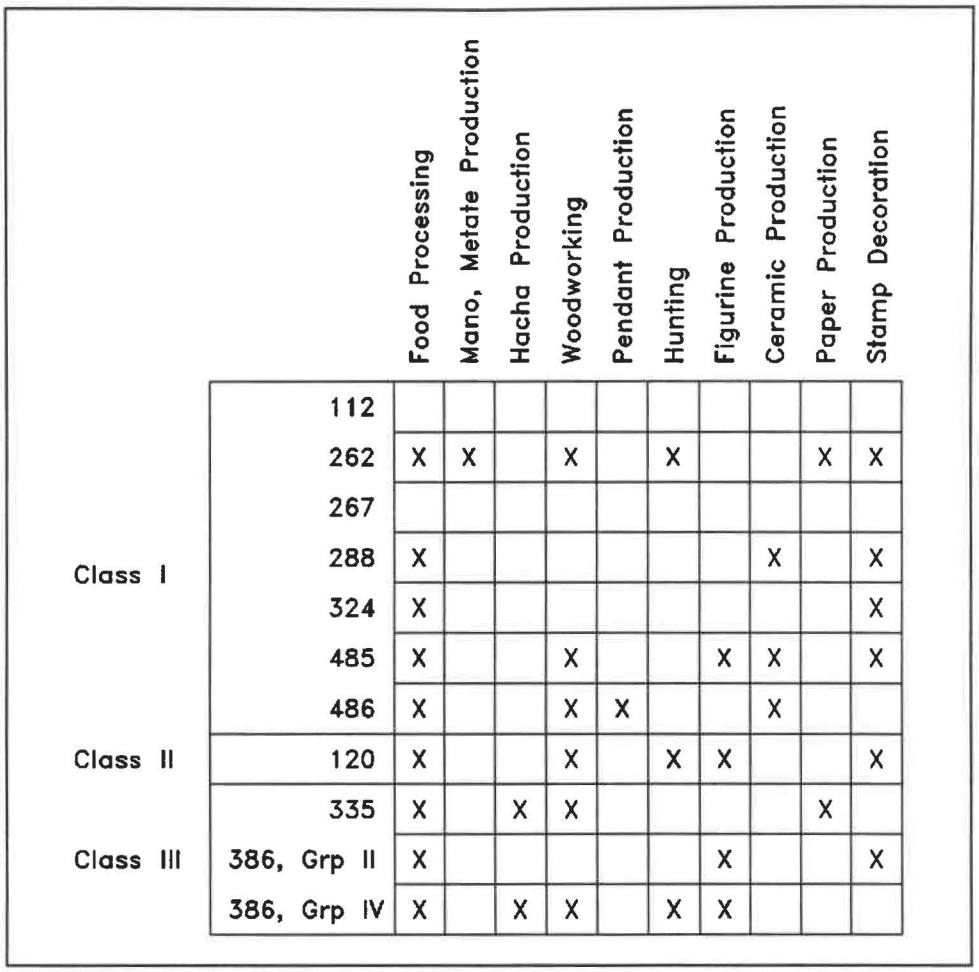
This idea of travel to agricultural fields is neither unrealistic nor without contemporary examples. Until a Naco cooperative recently sold its land on and adjacent to the Lomo de Jicaro (one of the most fertile areas in the entire valley), peasants lived in the modern town of Naco, where they did not own farm land, and walked or rode bicycles roughly five kilometers to their fields to farm. The current analysis is limited in that there is no way to determine

archaeologically just how far Late Classic rural farmers may have been willing to walk (or, as others may suggest, were forced to walk by elites controlling agricultural fields or settlement location) and how farming plots were obtained and retained by households. As a result, analysis of household developmental cycles was based upon the land on which the household sat, rather than the quality of land in adjacent areas.

Concluding Thoughts

As has been shown, agrarian households are diverse in all of their primary functions: production, distribution, transmission, reproduction and co-residence (e.g. Netting, Wilk and Arnould 1984; Wilk and Rathje 1982). While soil quality in the Late Classic Naco Valley did not have a large impact on any of these five functions, it is important to remember that this may be due to specific geographic conditions in the local area. In general terms, the majority of the valley contains arable, productive land. Certainly, some portions of the valley contain extremely poor agricultural land (Class III soil). However, this soil zone is only a small portion of the whole valley. Numerous ethnographic studies from wide ranging areas of the globe have shown that soil quality has had, and can have, a tremendous affect on households and their functions. In the Naco Valley, it is very important to understand what are, and what are not, major factors underlying household decision-making strategies

to better comprehend why households do what they do. This research has identified what factors may not have had a great impact on household functions and has offered some hypotheses for future research about what may influence household behavior patterns and developments.



		Food Processing	Mano, Metate Production	Hacha Production	Woodworking	Pendant Production	Hunting	Figurine Production	Ceramic Production	Paper Production	Stamp Decoration
Class I	112										
	262	X	X		X		X			X	X
	267										
	288	X							X		X
	324	X									X
	485	X			X			X	X		X
	486	X			X	X			X		
Class II	120	X			X		X	X			X
Class III	335	X		X	X					X	
	386, Grp II	X						X			X
	386, Grp IV	X		X	X		X	X			

Figure 6.1 Summary of activities undertaken by households, organized by soil class.

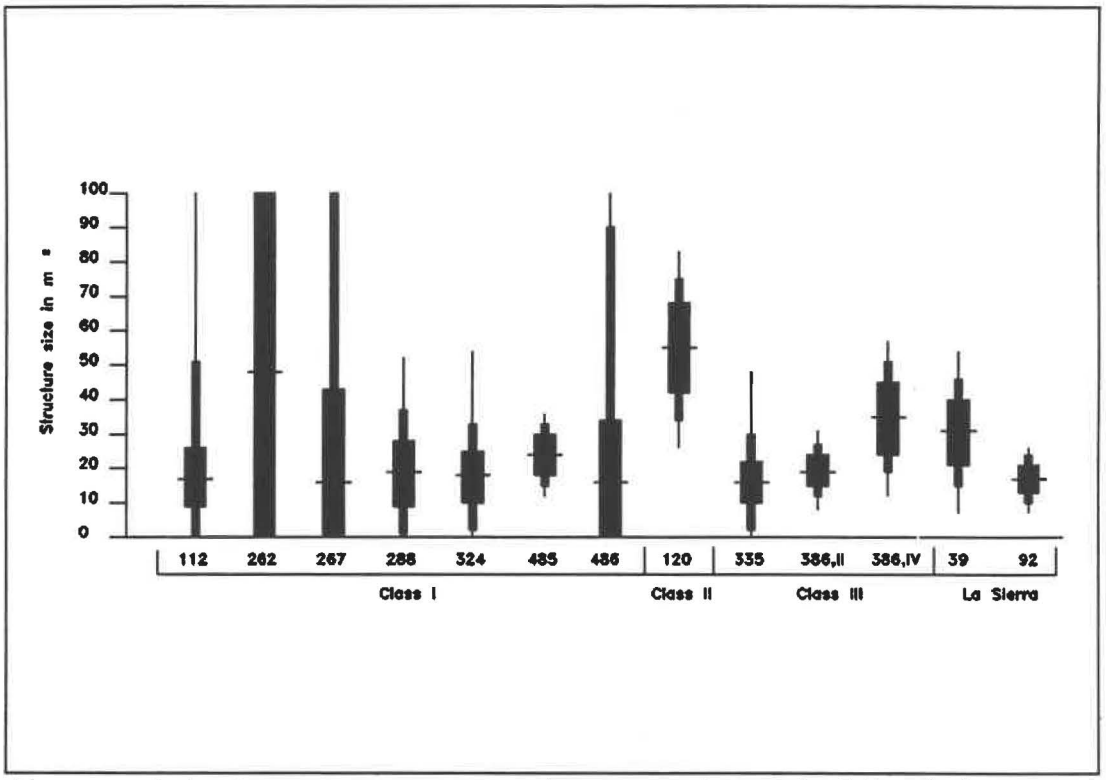


Figure 6.2 Mean structure size per household with error ranges for 80%, 95% and 99% confidence levels, organized by soil class.

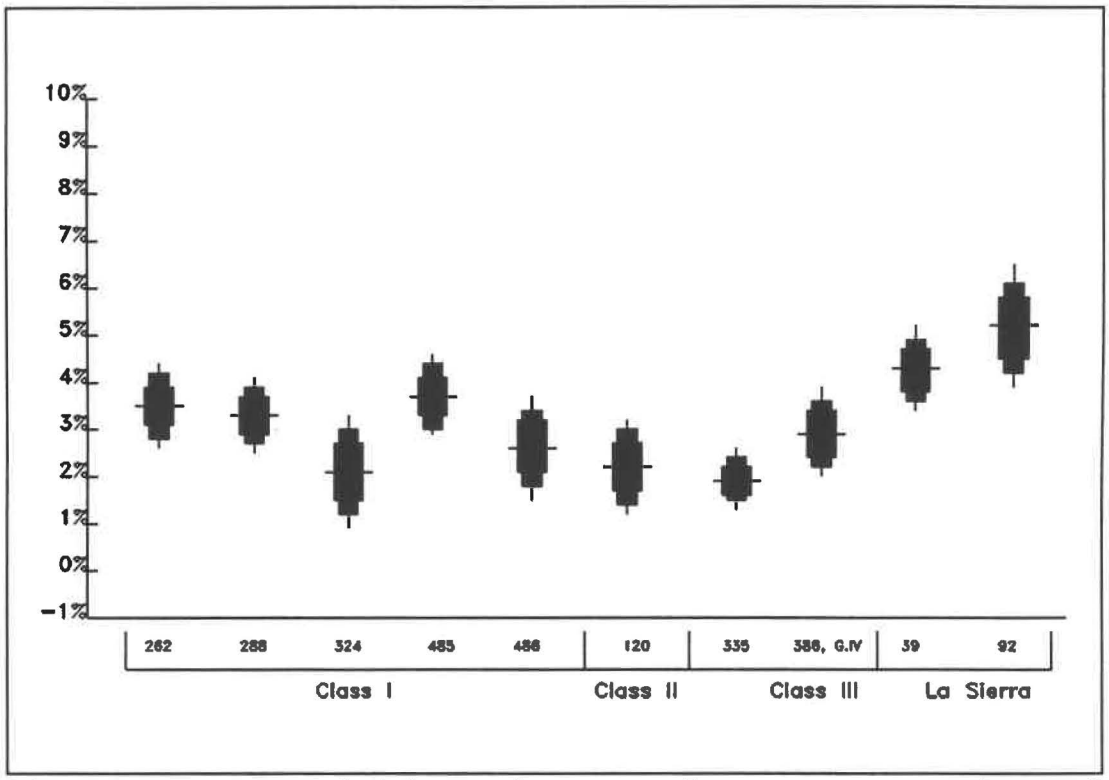


Figure 6.3 Household estimates of mean proportion of imported and elaborately decorated sherds per household, with error ranges for 80%, 95% and 99% confidence levels, organized by soil class.

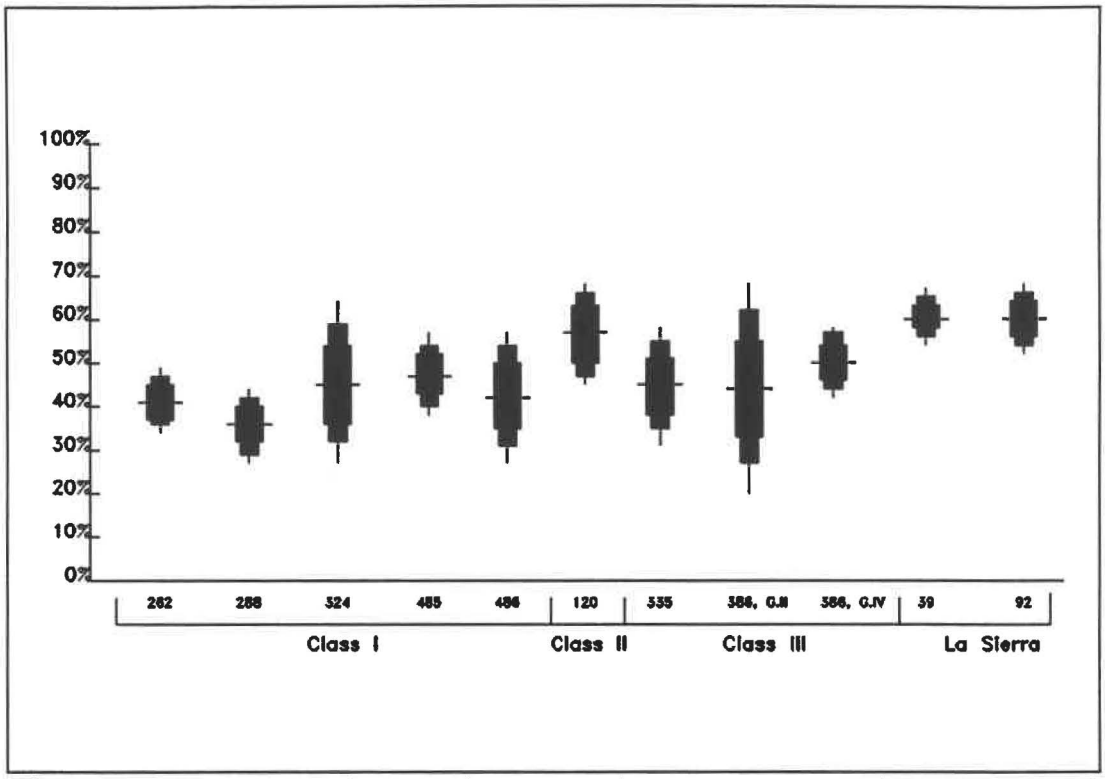


Figure 6.4 Household estimates of mean proportions of bowl rim sherds per household with error ranges for 80%, 95% and 99% confidence levels, organized by soil class.

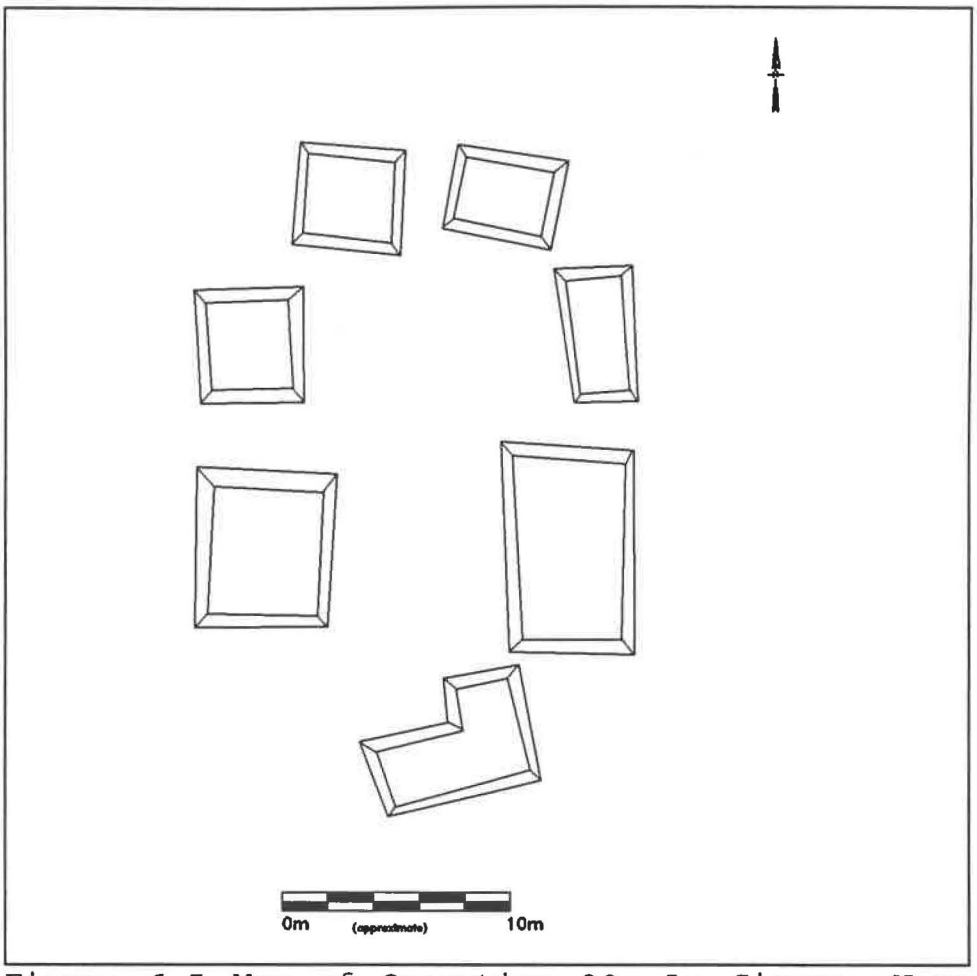


Figure 6.5 Map of Operation 39, La Sierra, Naco Valley.

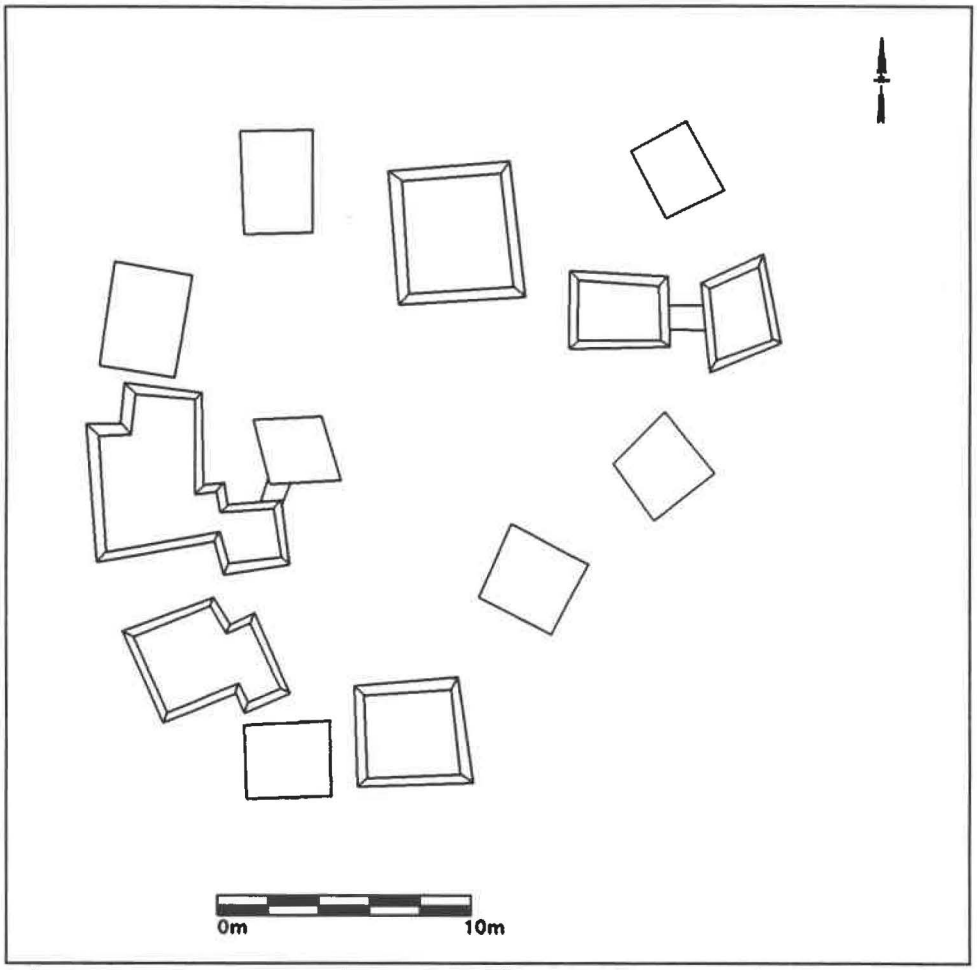


Figure 6.6 Map of Operation 92, La Sierra, Naco Valley.

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